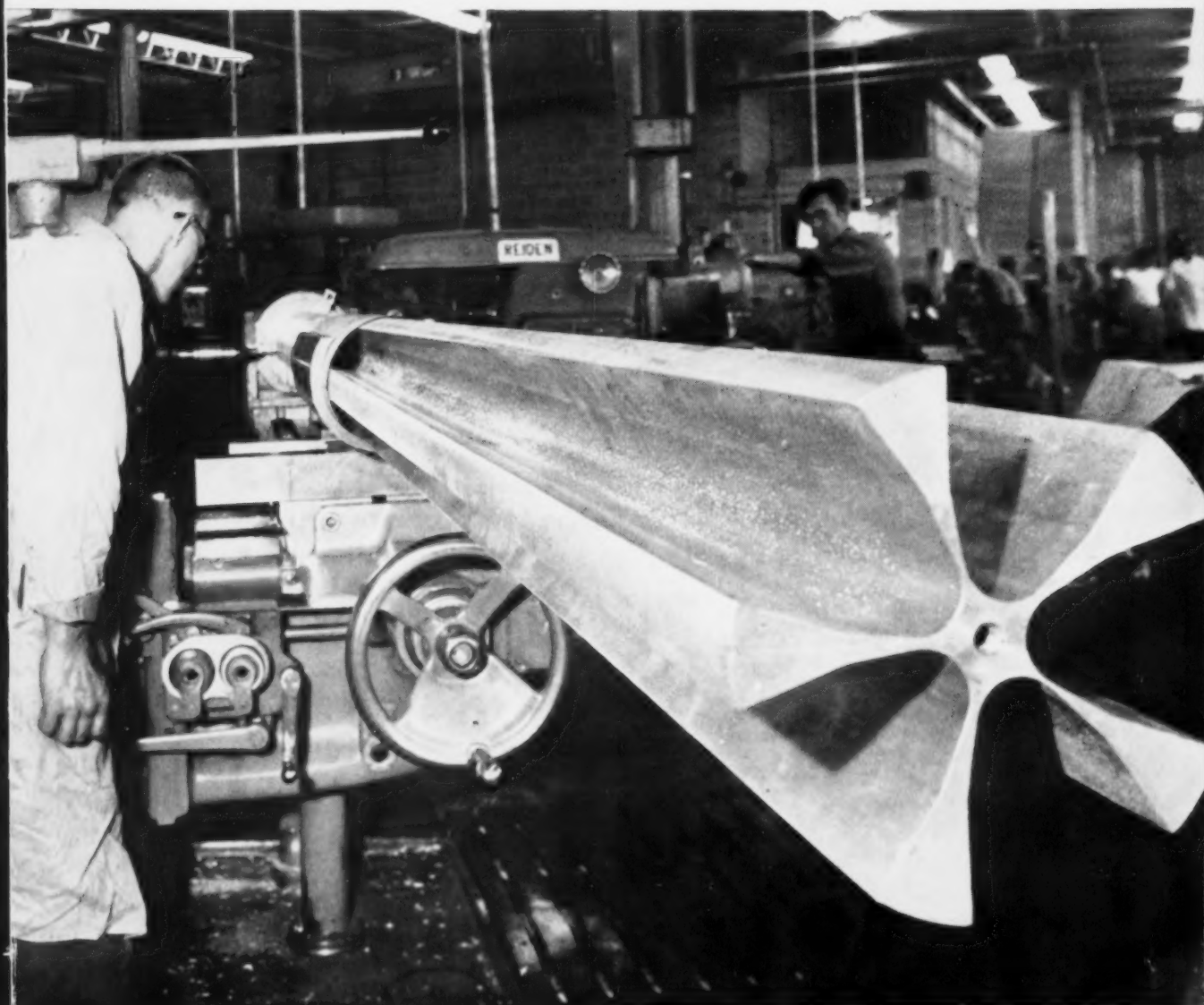


The IRON AGE

November 7, 1957

A Chilton Publication

The National Metalworking Weekly



**Can You Machine
Missile
Hardware? P. 121**

**How to Tighten Up
For Stiffer Competition — P. 79**

**Getting Ready For
Numerical Controls — P. 130**

Digest of the Week P. 2-3

ARISTOLOY 8620 LEADED

**Cut Production Cost
On this Coupling for
GARDNER-DENVER CO.**



**FASTER SPEEDS AND FEEDS ON 2 OPERATIONS
OVER 1/3 LONGER TOOL LIFE ON 3 OPERATIONS**

AUTOMATICS

	A.I.S.I. 8620	Aristoloy 8620 Leaded
Spindle Speed R.P.M.	246	301
Feed I.P.R.	.0081	.0081
Machine Speed S.F.M.	120	150
Drill Speed S.F.M.	65	80
Minutes Per Piece	1.59	1.29
Tool Life Increased 35%		

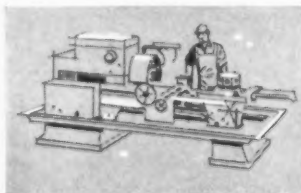
TURRET LATHES

	A.I.S.I. 8620	Aristoloy 8620 Leaded
Spindle Speed R.P.M.	296	496
Feed I.P.R.	.021	.021
Machine Speed S.F.M. (drilling & boring)	85	118
Minutes Per Piece	2.31	1.91
Tool Life Increased 35%		

HOB MILLS (Threading)

Hob Speed S.F.M.	273*
Feed I.P.R.	11.8
Minutes Per Piece	1.84

*Maximum speed for machine. Changing to leaded Aristoloy brought about no improvement in machining time. However, tool life was increased 40%.



JUST OFF THE PRESS

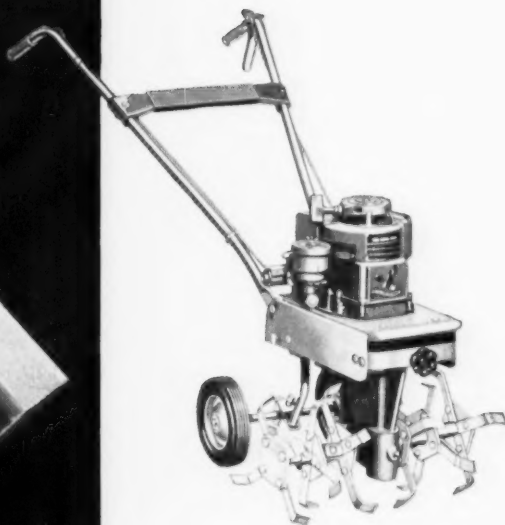
For information on leaded steels, write for new In-page booklet. Complete data on application of lead treated steels, plus data on mechanical properties and characteristics.



COPPERWELD STEEL COMPANY • Steel Division

4001 Mahoning Avenue • WARREN, OHIO

EXPORT: Copperweld Steel International Co., 225 Broadway, New York 7, N.Y.



55 pct saving in direct labor costs by making tines from special sections



A leading maker of garden tillers recently switched to Bethlehem special bar sections with impressive results. Here's what the customer reports:

They formerly made the tines from $\frac{3}{16}$ -in. x 1-in. C-1045 standard bars. Processing required three basic operations:

1. Cut the blank to length and punch hole for rivet;
2. Grind bevel (blanks were hand-loaded on a rotating belt equipped with an automatic grinding fixture);
3. Bend end on hydraulic press.

Then they switched to the hot-rolled special section illustrated here, with these results:

*They avoid double handling because—
they have completely eliminated the grinding operation;
they have freed the bending press for other jobs.*

The customer reports a 55 pct saving in direct labor costs thanks to special sections!

Manufacturers of blades, cutter bars and underknives for lawn mowers, as well as tines and blades for garden, agricultural and earth-moving equipment of all sizes are increasingly turning to hot-rolled special sections to cut their fabricating costs. Expensive grinding, milling, shaping, and flame-cutting operations have been eliminated, with remarkable savings.

Perhaps special sections could save money for you, too. May we discuss possibilities with you? Please contact the Bethlehem sales office nearest you.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by
Bethlehem Pacific Coast Steel Corporation. Export
Distributor: Bethlehem Steel Export Corporation

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THE IRON AGE
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The IRON AGE

November 7, 1957—Vol. 180, No. 19

Digest of the Week in

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stricting markets. Here are the
steps each followed in not only
holding their own but in expanding
their markets and sales without
radical product changes. P. 79

A HORNET'S NEST

U. S. Versus Europe—Sen. Ke-
fauver got quick reaction when he
charged that American steel tech-
nology was lagging behind that of
Europe. Consensus: He doesn't
know what he's talking about. P. 82

3RD QUARTER EARNINGS

Drop Below Second—Continued
buyer resistance brought a decline
in steel profits for the third quarter
of the year. However, on the basis
of nine-month totals — in some
cases setting records—1957 looks
like a good year. P. 83

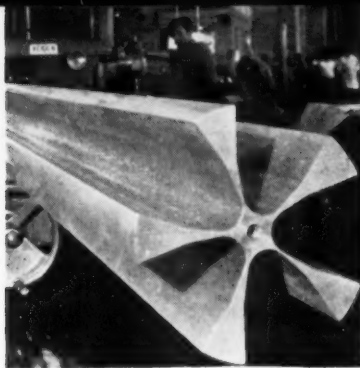
TIPS ON SAFETY

Safety Problems Solved—There's
an answer to every safety problem
in your plant. Safety engineers came
up with a batch of them at the Na-
tional Safety Congress in Chicago.
Case histories cited. P. 84

SAFETY AUTO

Will Detroit Buy It?—Engineers
in the nation's auto capital ex-
amined the Cornell-Liberty safety

Metalworking



car with interest. Producing the car wouldn't be difficult, they say. But would it sell? P. 96

TAX CUTS?

Not Likely Now—Even before the Russians launched Sputnik, rising costs were eating into the Treasury's slim surplus. With renewed emphasis on missiles, tax cuts can be regarded as a dead issue. P. 101

FEATURE ARTICLES

IRON IN COPPER

Improves Forgeability — Small quantities of iron produce some startling effects in certain copper-base alloys. Increasing amounts of it improve the grain structure and make Cu-Ni-Si-Al alloys easier to hot forge. Pouring temperature is also a factor. P. 125

CARBON-STEEL STAINLESS

Has High-Chrome Case—A new diffusion process makes plain carbon steel sheet stainless. It's done by exposing the sheet to chromium-containing chemicals at high temperatures, now makes it possible to have high-chrome protection on inexpensive base metal. P. 128

NUMERICAL CONTROLS

Train for Them Now—A tape-controlled machine tool isn't just another piece of equipment. It calls for some radical changes, affects nearly every operation from idea to design and finally the machined part. Advance planning makes the

transition easy, helps workers adjust faster. P. 130

SOLDERING ALUMINUM

Without Flux—An inexpensive and stable zinc-base alloy is the key. It penetrates the tough oxide film and wets the aluminum with a single stroke of the solder stick and makes joints stronger than the aluminum itself. P. 133

PREVENT EXPLOSIONS

New Valve Does It—Lighting-off explosions at gas-fired ovens and heat-treat furnaces can be prevented—first, by having a well-trained operator who'll strictly follow the right lighting procedure; and second, by this control system that makes him remember. P. 134

MARKETS & PRICES

GEAR DELIVERIES

Will Remain Good—Users of gears and other mechanical drives can expect delivery promises to remain stable. There also appears little chance for either price increases or decreases. P. 178

NEXT WEEK

FORGEABILITY TESTS

What's the Answer?—The U. S. is the world's largest producer of quality forgings. But can our know-how meet future demands without better ways to make forgeability measurements? Next week's feature explores this vital question.

MISSILE HARDWARE: Can you machine it? There's a lot of this kind of work around if you can. A pioneer in the field spells out the challenges, the opportunities, and what you need in the way of talent and equipment to get in on the missiles boom. P. 121

ALUMINUM CANS

Kaiser's Bid—With a new deep drawing technique and a contract from Kraft Foods, Kaiser Aluminum is leaping into the can market with both feet. It believes this could be the biggest market for aluminum. P. 88

FARM MODERNIZATION

Means Metal Sales — Products made from metal are benefiting from farmer interest in new methods and equipment. Wanted are products for irrigation, hay and grain drying, cooling, feed handling. P. 103

MACHINE TOOL SALES

Curve Is Falling—New orders in September were 35 pct below August and 64 pct under a year ago. Still, 1957 is expected to be a good year. P. 105

MISLEADING FIGURES

Ingot Rate Villain—Steel men complain that the ingot production rate makes their business seem worse than it is. A better barometer is available, but it's often overlooked. P. 177



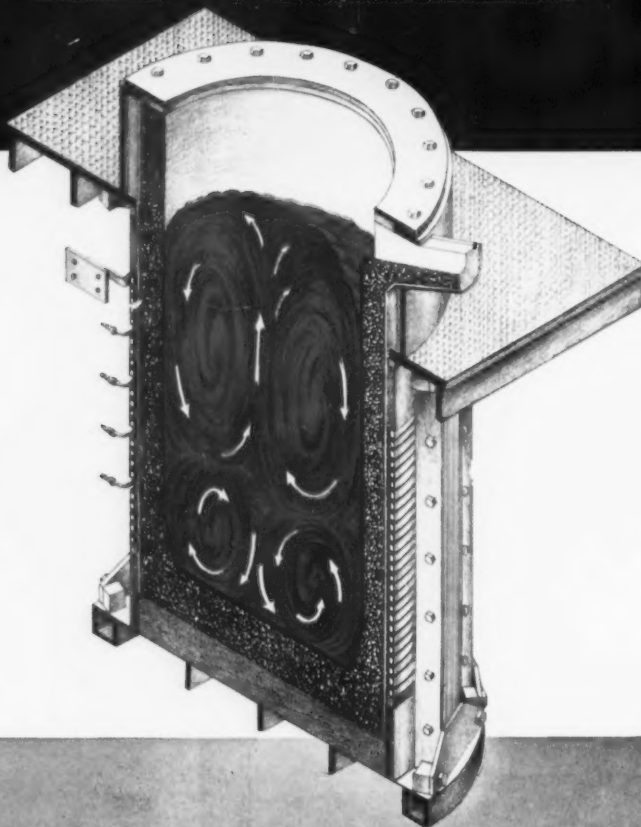
See it
at the Show*

**CORELESS
60 CYCLE
INDUCTION
MELTING
FURNACE**

*THE METAL SHOW
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AMPHITHEATRE
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BULLETIN R-52

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A cylindrical induction coil supplied with ordinary 60 cycle current induces heat and vigorous electromagnetic stirring in the molten metal charge. Integrated electric controls regulate power, maintain high power factor automatically. Monolithic refractory linings are made by ramming against the sturdy water-cooled coil held in a rigid frame of magnetic and structural steel.

This new principle was perfected in Europe over the last seven years. Over 100 Junker furnaces are now in use. AJAX-JUNKER designs are based on latest experience, using American components and practices throughout.

Outstanding results are proven in these fields:

DUCTILE AND ALLOY IRON CASTINGS
RECOVERY OF IRON TURNINGS
RECOVERY OF ALUMINUM SCRAP

Available sizes range from 1 to 10 tons, with normal melting cycles from 2 to 4 hours. Power ratings are 200 kw through 1500 kw.



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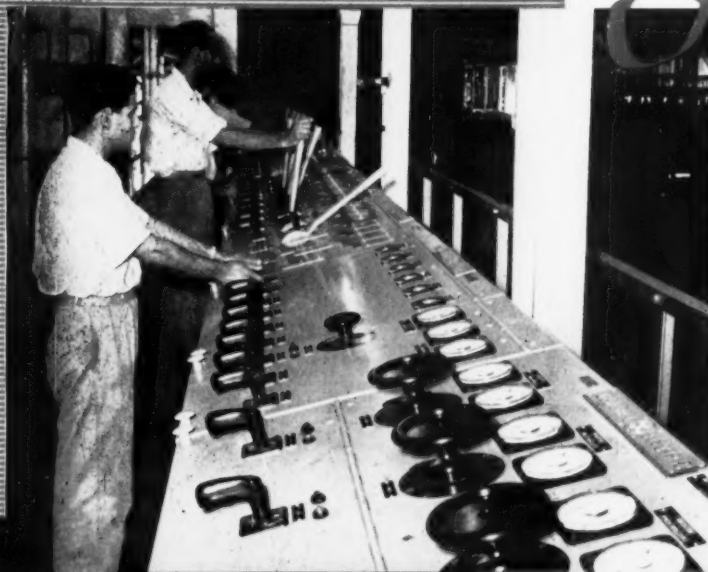
MORGAN MILLS

at work in

India

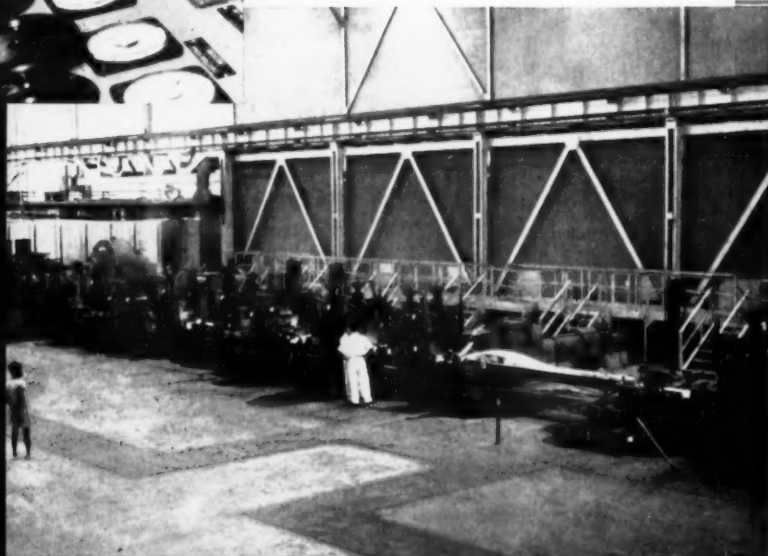
14" SKELP MILL

Tata Iron and Steel Co., Ltd.
JAMSHEDPUR, INDIA



Since 1917 Morgan Construction Company has been contributing skilled engineering talent and precision built continuous rolling mills to the national growth of India. The mill illustrated here is a 14" skelp mill recently installed for the Tata Iron and Steel Company at Jamshedpur.

This modern skelp mill is just one example of two-hundred and twenty-one Morgan Rolling Mills that have been designed, built and installed in plants all over the world.



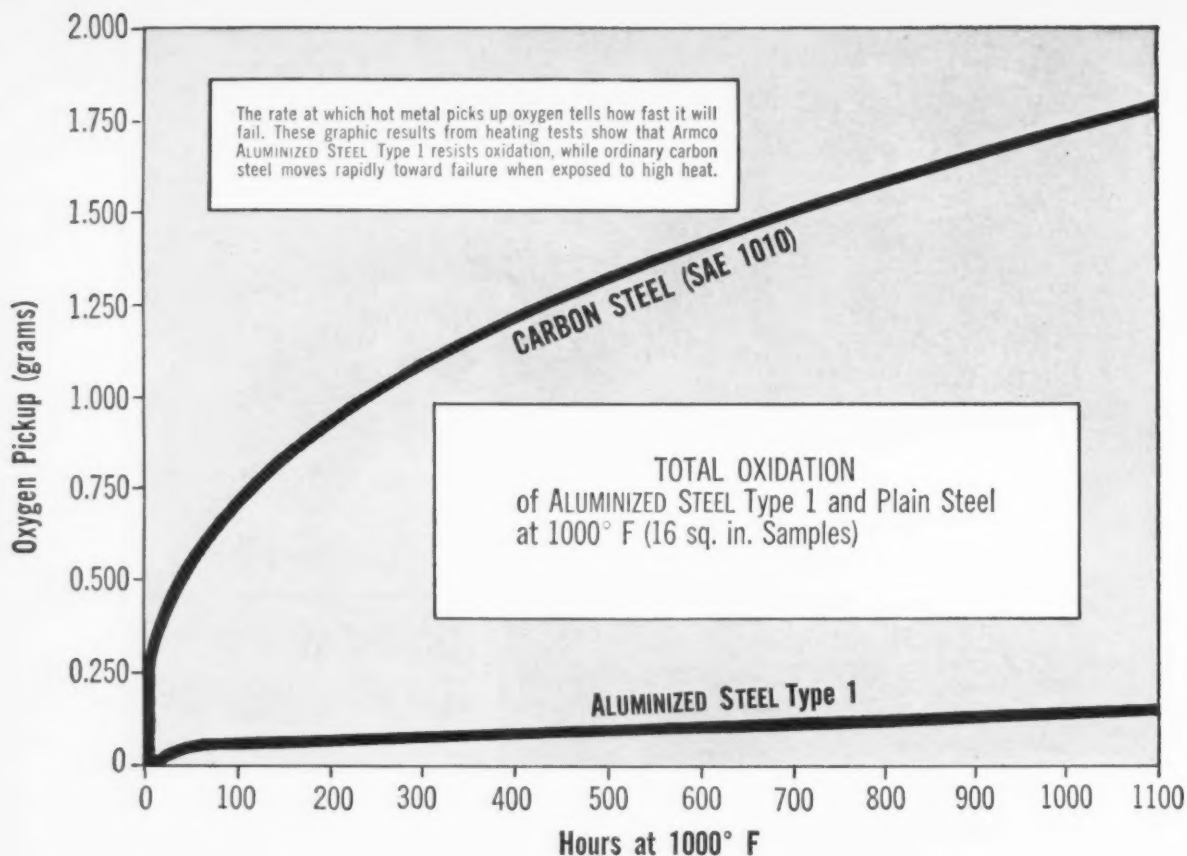
MORGAN

WORCESTER

MORGAN CONSTRUCTION CO., Worcester, Massachusetts

Rolling Mills • Morgoil Bearings • Wire Mills • Regenerative Furnace Control • Ejectors • Gas Producers

RM 73



Test Shows How Well Armco ALUMINIZED STEEL Resists Heat

Armco ALUMINIZED STEEL® Type 1 (steel hot-dip coated with aluminum) stands up to heat because it withstands destructive scaling. This test shows how well.

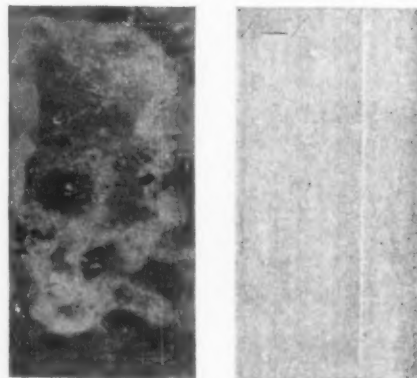
Above 900 F, an iron-aluminum alloy forms on the surface of Armco ALUMINIZED STEEL Type 1. It becomes a tightly-adherent refractory material that protects the base metal. Ordinary carbon steel lacks this protection. The powdery and flaky oxides which form on the surface of carbon steel fall away, exposing it to further attack.

Economical Double Protection

Armco ALUMINIZED STEEL Type 1 not only resists heat, it fights corrosion at the same time. In fact, this special 2-in-1 metal beats back deadly combinations of heat and corrosion better than any metal in its price class.

If parts of your products are exposed to a combination of heat and corrosion, it may pay you to get all the facts about Armco ALUMINIZED STEEL Type 1. It could be a low-cost solution for your problems.

Complete information on this special coated steel is readily available. Just call your nearby Armco Sales Office or write us at the address below.



After 1100 hours at 1000 F. **Right**—Armco ALUMINIZED STEEL Type 1; **Left**—SAE 1010 Steel.

ARMCO STEEL CORPORATION

1537 CURTIS STREET, MIDDLETOWN, OHIO

SHEFFIELD STEEL DIVISION • ARMCO DRAINAGE & METAL PRODUCTS, INC. • THE ARMCO INTERNATIONAL CORPORATION



Our Industrialist: Saint, Sinner or Regular?

One of our national pastimes is to take apart the American businessman. It has always been quite a sport—for authors and critics.

The general theme is that he is a cold-hearted fellow. He has no time for the finer things of life. He is dead set on getting to the top rung—no matter whose throat he cuts. That is the basic outline of most run-of-the-mine books on executives.

Of course there is the other extreme: Our top man is the epitome of all that counts in brains, salesmanship, leadership and organization. He is often painted so precise that one is left with the idea that he never makes a mistake.

Speeches often written for him lead one to believe that each hour on the hour our industrialist knows what is happening in Asia, Europe, U. S. A.—and in his own organization.

Then comes Congress. Here is where our leaders really take it on the chin, on the back and sometimes in the face. The average businessman—of whom there is none—is looked upon by Congressional Committees as a potential or actual monopolist. He is suspect—always. He is usually guilty, not until proven innocent, but he is guilty

as long as the Congressman says he is. No manner of presentation, argument or straight talk can change this pattern.

At times the American businessman isn't sure what he is. He knows he isn't a frequenter of the diabolically painted "executive suite." He knows he isn't always stabbing his friends in the back or laying plans to knock off his boss' job. For a moment he may lose enough confidence to fall for some of the clap-trap that goes under the name of "a realistic, two-fisted story on the struggles and victories of Dagbert Hardfeller."

What kind of a man is our top level industrialist? If he isn't a cross section of all this mish-mash, what is he? He is neither a saint, nor a sinner, nor a regular guy. He is a mixture of all three. Often he acts pontifical, but he really isn't—that's what's expected of him. Of course he makes mistakes, but he isn't allowed to admit them. And he is definitely a regular fellow when you get behind the scenery.

Probably his biggest asset—and liability—is his iron discipline over his feelings. That's why he often has an ulcer or a coronary. Otherwise he is like you and me.

Tom Campbell

Editor-in-Chief

COMMERCIAL Custom Stamping
for every industry...



Cuts material costs 50%!

By making it possible to switch from a forging made from hot rolled tubing at 15 cents a pound, to a stamping made from mild flat steel at 6 cents a pound, Commercial has been able to effect a substantial saving for a leading manufacturer of diesel locomotives.

AN EXHAUST ELBOW TUBE is the part in question. There are 32 of them on each 16-cylinder diesel engine. Commercial makes two open stamping for each elbow, which are welded together automatically. Each half-stamped from 1/4-inch flat steel—is held to rigid tolerances of $+0 -1/32$. The ends need no trimming either, and fit both the engine block opening and manifold to which they are welded, right on the button. Now,

strong, even welds with full penetration are routine.

UNUSUAL FORMING PROBLEMS like this one—in every industry—are routine at Commercial. The skill of Commercial engineers, plus Commercial's "die-bank" of over 2300 basic die components, may be just the cost-saving solution you need for your component forming problem. You can make Commercial prove it—without cost or obligation—by simply sending along a blueprint, sketch, or even sample of the part you are now making or plan to make.

Address inquiries or requests for forming engineering assistance to The Commercial Shearing and Stamping Company, Dept. K-45, Youngstown 1, Ohio.

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LETTERS FROM READERS

Open Letter

Sir—I am enclosing a copy of my open letter to Senator Kefauver, involving his present price investigation.

I could have told the Senator that as a Purchasing Officer for the Navy in Washington during World War II how we saved the taxpayers millions of dollars by bringing down the prices of stainless steel welding electrodes, but our approach was not the same as the Senator's.—W. F. Horsch, W. F. Horsch Co., Grosse Pointe, Mich.

■ Mr. Horsch's letter to Senator Kefauver follows.—Ed.

Dear Senator:

Recent newspaper reports credit you with the proposal of "spurring competition in the steel industry by cutting prices."

Back in October, 1929, the steel company I was representing at that time sent me to New England to hold their steel wire and nail business and to increase the tonnage if possible. At that time, nails were selling for \$2.65 per 100 lbs base. (Before the depression of the 1930's was over, nails dropped to a low of \$1.70 per 100 lbs.)

Some steel competitors entered our territory for the first time as the depression continued. These competitors first tried, as newcomers, to take away our customers, whom we had been loyally supplying through peace and war, through times of scarcity and times of plenty, but could not do so at equal prices. Then, Senator, these competitors did what you now suggest.

THEY CUT PRICES. The steel market was demoralized. Salesman did not know what prices to quote. They frequently had to find out what others were quoting in a toppling market. Prices dropped as much as \$8.00 a ton overnight. Steel salesmen were laid off. Territories were combined. Salaries were drastically cut. Operations at

the steel mills dropped as low as 33 pct. Men were laid off at our mills by the thousands. Pessimism was rampant.

We met the cut prices to hold our accounts. Did cut prices bring in more tonnage? No, Senator, they did not! We just went deeper into the red. And if you will consult the earning records of the nation's steel industry during a period of "cutting prices to stimulate business"—during the depression—you will observe that only a few steel firms kept continuously in the black throughout that period. All other steel companies showed red ink figures at some time during that period of "cutting prices to stimulate business." That earning record is your answer, Senator.

Sincerely,
William F. Horsch

P.S. Red figures can even make workers feel "very blue."

Constructive

Sir—Will you please send four copies of your Oct. 17 Survey Report, "How to Plan New Products."

This is the most constructive report that we have read on this subject.—D. R. Percival, Pres., Machinery Electrification, Inc., Northboro, Mass.



"Of course, there's a crane in there! So what?"

Need a Finish You Can Depend On?



It will pay you to consult

Somers

If you are having a problem with the finish on thinstrip brass, nickel, copper or alloys from .000175" to .010", Somers' nearly 50 years of specialized experience can lick it for you.

A typical example is the fine grain size provided on the exclusive Somers Uni-grain® brass for deep drawn parts. This requires only a simple color buff after drawing for a polished finish; the fine grain eliminates heavy buffing and orange peel effect.

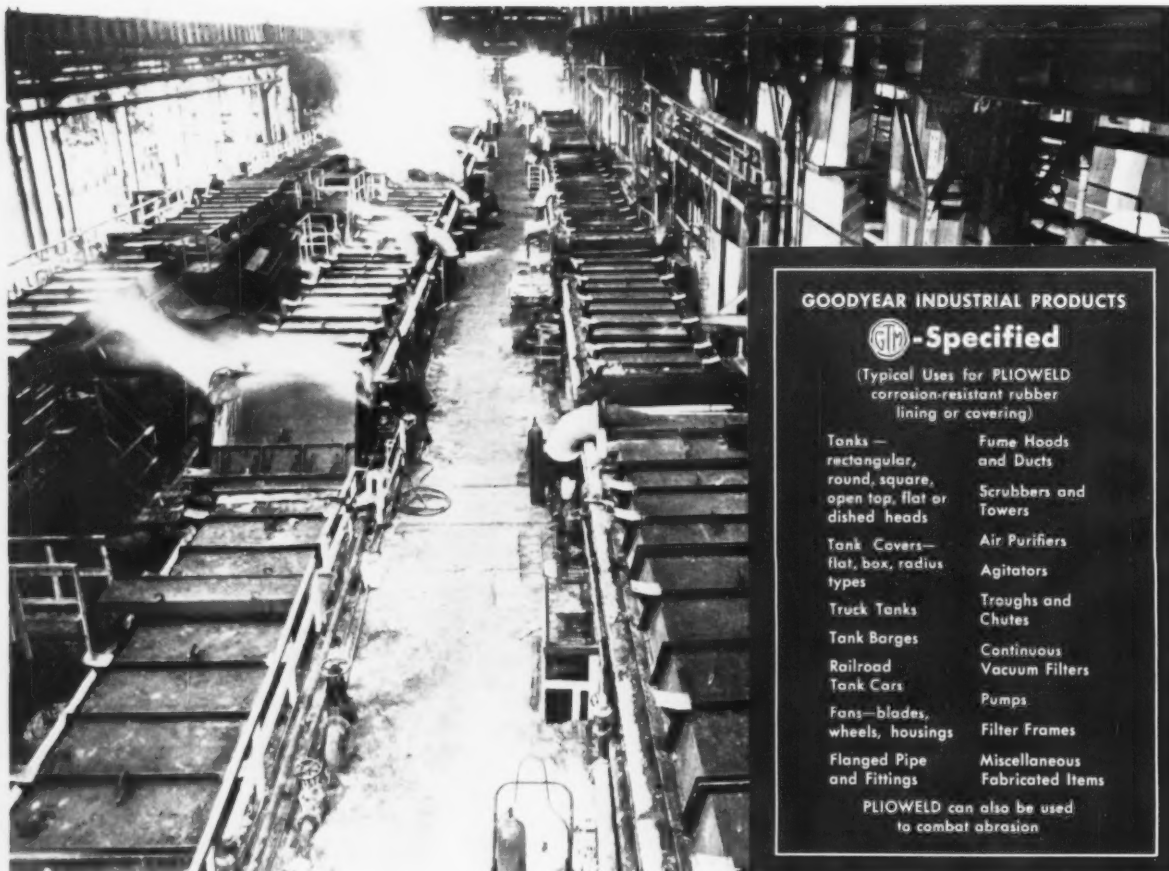
Whatever your problems with thinstrip metals, they're finished when you take them to Somers engineers for a complete analysis without cost or obligation.

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GOODYEAR INDUSTRIAL PRODUCTS



-Specified

(Typical Uses for PLIOWELD
corrosion-resistant rubber
lining or covering)

Tanks — rectangular, round, square, open top, flat or dished heads	Fume Hoods and Ducts
Tank Covers— flat, box, radius types	Scrubbers and Towers
Truck Tanks	Air Purifiers
Tank Barges	Agitators
Railroad Tank Cars	Troughs and Chutes
Fans—blades, wheels, housings	Continuous Vacuum Filters
Flanged Pipe and Fittings	Pumps
	Filter Frames
	Miscellaneous Fabricated Items

PLIOWELD can also be used
to combat abrasion

Keeps pickle line perking for 17 years

Keeping a giant-size pickling line in steady production is no little trick. Especially in a big-name steel mill like this one—turning out millions of tons a year.

Their 25% sulphuric pickling solution wages constant acid attack on whatever equipment used. And the above-average 225°F operating temperatures are especially hard on rubber—preferred linings for most pickling tanks.

Right from the beginning, the G.T.M.—Goodyear Technical Man—saw these tough conditions as a good spot for PLIOWELD—the acid- and abrasion-

resistant rubber by Goodyear. How right was he? At last report, the PLIOWELD tank linings had given 17 straight years of more-than-satisfactory service—still looked good for many more.

That's no rare case, either. Wherever the G.T.M. tackles a problem—and solves it with a super-quality Goodyear product like PLIOWELD linings—you can count on exceptional service. Give him a try by contacting your Goodyear Distributor—or writing:

Goodyear, Industrial Products Division,
Akron 16, Ohio.

PLIOWELD TANK LININGS by

GOODYEAR

THE GREATEST NAME IN RUBBER

Ploweld—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

IT'S SMART TO DO BUSINESS with your Goodyear Distributor. He can give you fast, dependable service on Hose, V-Belts, Flat Belts and many other industrial rubber and nonrubber supplies. Look for him in the Yellow Pages under "Rubber Goods" or "Rubber Products."

FATIGUE CRACKS

Cupola Capers

We've heard many stories about the strange goings on at clambakes but this one really takes the oyster stew.

The Foremen's Club of Superior Foundry, Cleveland, recently held a molding contest for customers attending its annual clambake. The "Clambake Foundry" was complete with two squeezer machines, CO₂ core-making equipment and white metal furnaces.

Clear Case—With Superior foreman acting as technical advisors,



Customer molder at work.

the customers, many of whom had never molded before, were delighted to put on white coats and get their hands in the sand. Other sharp-eyed customer inspectors served as judges.

The sand that stuck to the pattern, the rough cores and metal runouts made it clear that the job of producing high quality castings is truly an art.

Help Wanted

One hears a lot of talk these days about missiles, rockets—and one or two sputniks. Too much talk, maybe. What's needed is action, far more than we've had heretofore.

So it behooves us to not talk generalities about U. S. missile and rocket programs. Such stories aren't very constructive, really.

Instead, we'll talk in specific terms—what the metalworking industry can do to speed development and production of these new weapons. And we'll start by telling machine shops how they can help by producing much-needed missile hardware.

We got the full story on what's required in the way of equipment and ability straight from a leader in the missile hardware machining business. You'll find it on p. 121.

What Is A Woman?

Here is a chemical analysis of women, thanks to Seng Co.'s house organ:

Symbol: Wo

Occurrence: Wherever man is found.

Physical Properties: Great attraction to gold, silver, platinum, and precious stones. Violent reaction if left alone. Able to absorb great amounts of expensive food matter. Turns green when placed beside better-looking specimens.

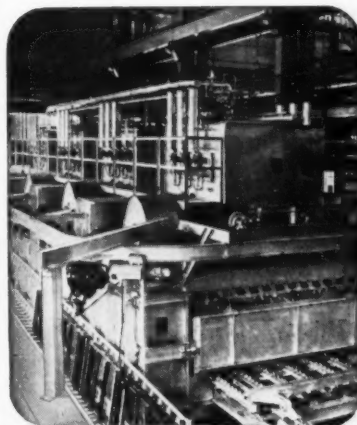
Uses: Highly ornamental. Useful as a tonic for acceleration of low spirits. Useful as an equalizer in the redistribution of wealth.

Caution: Highly explosive in inexperienced hands. Very complex and results in many unexplainable actions. Highly unpredictable; should be watched always.

Puzzlers

Some more winners of the Bongo puzzler: H. C. Meyers, Jr., Midvale-Heppenstall Co., Nicetown, Pa.; Everett Angell, Red Seal Metals Co., South Gate, Calif., and R. W. Hautzenroeder, Massey-Harris-Ferguson, Detroit. The answer: The man telling the truth would indicate two of the roads. The liar would point out one road.

HEAT TREATS ALUMINUM ALLOYS UNIFORMITY $\pm 2^{\circ}\text{F}$.



R-S FURNACES AT WYMAN-GORDON KEEP QUALITY UP ... COSTS DOWN

Where aluminum alloy forgings for 18,000 ... 35,000 ... and 50,000 ton presses must be heat treated to absolute uniformity R-S Furnaces were entrusted with the job. Six R-S Furnaces at Wyman-Gordon Products Corporation handle all types and sizes of forgings with extreme flexibility and maintain a uniformity of plus or minus 2° F. to 1100° F. Work is pushed thru furnace in steel trays in two rows on roller rails. Every piece emerging has absolute uniformity regardless of size, shape or weight.

For higher quality in heating and forging write for the illustrated folder giving full technical details to...

R-S FURNACE CO., INC.
Philadelphia 44, Pa.



Car Hearth Furnaces
Continuous Furnaces
Rotary Type Furnaces





What
has
changed?

The automobiles of today are certainly different than the models shown in this photo of downtown Chicago. Many other things have also changed since this picture was taken.

One thing that remains unchanged — as it has for the past 36 years — is the remarkable spirit of service that has guided THE CHICAGO CONCRETE BREAKING COMPANY (recently re-named THE EDWARD GRAY CORPORATION) to its commanding position in modern demolition and construction. Here is skilled know-how and experience . . . designed to save you both considerable down-time and money on your emergency repairs, rehabilitation of present facilities, or new construction.

THE EDWARD GRAY CORPORATION offers complete design, engineering and construction service for all your needs, whether the job is small and easy, or large and complex.

We welcome all inquiries by saying, as we have for 36 years,

"WANTED! A HARD JOB"

General Offices:
12233 AVENUE "O", CHICAGO 33, ILL.
TELEPHONE BAYPORT 1-8400

THE EDWARD
GRAY
CORPORATION
FORMERLY CHICAGO CONCRETE BREAKING CO.

Eastern Offices:
213 COREY AVENUE, BRADDOCK, PA.
TELEPHONE ELECTRIC 1-1656

EXHIBITS, MEETINGS

Eighth National Plastics Exposition
—Nov. 17-21, International Amphitheatre, Chicago. (Society of the Plastics Industry, 250 Park Ave., N. Y. 17.)

Exposition of Chemical Industries
—Dec. 2-6, New York Coliseum. (International Exposition Co., 480 Lexington Ave., N. Y. 17.)

Third Annual National Construction Industry Conference on Creative Trends in Structural Design
—Dec. 4-5, Congress Hotel, Chicago. (Armour Research Foundation of Illinois Institute of Technology, 10 W. 35th St., Chicago 16.)

Plant Management and Engineering Show—Jan. 27-30, 1958, International Amphitheatre, Chicago.

NOVEMBER

National Assn. of Waste Material Dealers, Inc.—National fall meeting, Nov. 8-15, Hotel Ambassador, Los Angeles. Society headquarters, 271 Madison Ave., New York.

Steel Founders' Society of America
—T & O conference, Nov. 11-13, Carter Hotel, Cleveland. Society headquarters, 606 Terminal Tower, Cleveland.

National Electrical Manufacturers Assn.—Annual meeting, Nov. 11-15, Traymore Hotel, Atlantic City. Society headquarters, 155 E. 44th St., New York.

American Mining Congress—Coal division conference, Nov. 15, William Penn Hotel, Pittsburgh. Society headquarters, 1200 18th St., Washington, D. C.

Air Conditioning and Refrigeration Institute—10th exposition, Nov. 18-21, International Amphitheatre, Chicago, Society headquarters, 1346 Connecticut Ave., N.W., Washington 6, D. C.

Investment Casting Institute—Meeting, Nov. 13-16, Sheraton-Cadillac

(Continued on P. 16)



Easiest, fastest way to kill fire... **KIDDE NEW DRY CHEMICAL EXTINGUISHER**

Here — from Kidde — is the newest, the fastest, the easiest-to-operate dry chemical fire extinguisher!

Look at the extra large, aluminum handle and trigger — even a gloved hand fits comfortably with room to spare. Pick the unit up — it hangs straight — no awkward angle to throw you off balance.

If fire strikes, follow the simple directions: "Remove Horn" — automatically the trigger safety lock is released — "Pull Trigger" — instantly a cloud of fire-killing dry chemical whooshes out of the nozzle and fire's out! With this unit, designed by Kidde engineers working with Henry Dreyfuss personnel, you don't have to be a trained fireman to get perfect results.

Built for a lifetime of use, the handsome, new 20 and 30 pound Kidde dry chemical extinguishers have top ratings from Underwriters' Laboratories, require only 225-250 psi charging pressure. The rugged pressure gauge is recessed in handle for maximum protection. Tells at a glance if the unit is ready for use.

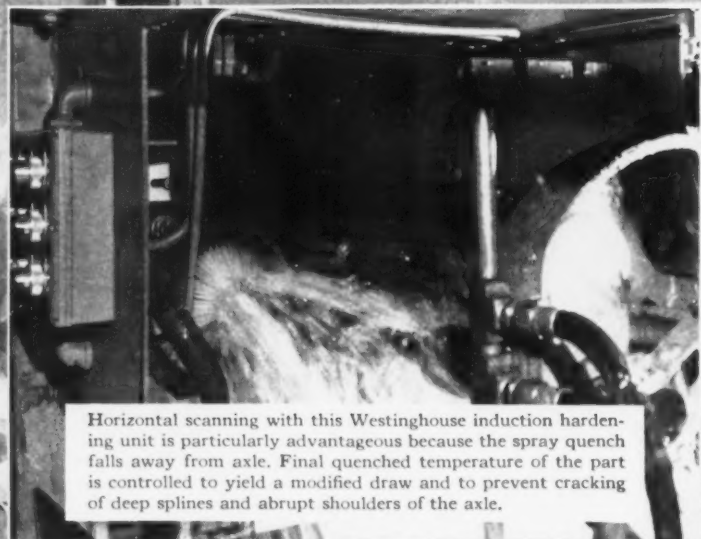
Available nationally through Kidde's sales and service organization. Write Kidde today for the name of nearest distributor.



Kidde

Walter Kidde & Company, Inc.
1149 Main Street, Belleville 9, N. J.
Walter Kidde & Company of Canada Ltd., Montreal—Toronto

WHAT'S HAPPENING AT



Horizontal scanning with this Westinghouse induction hardening unit is particularly advantageous because the spray quench falls away from axle. Final quenched temperature of the part is controlled to yield a modified draw and to prevent cracking of deep splines and abrupt shoulders of the axle.

PRODUCT AND PROFIT IMPROVEMENT

OLIVER CORPORATION?

They are Saving More Than \$1.00 per Axle
... with Westinghouse Induction Heating!

Here's really important news to everyone in metalworking. At Oliver Corporation, Charles City, Iowa, plain carbon steel is automatically heat treated to meet strength specifications . . . one operator takes care of automatic scanning, rapid heating, controlled quench . . . and the Westinghouse Induction Heating units are adjustable to accommodate eleven types of axles. In addition to savings of more than \$1.00 per axle because the Westinghouse units made possible the change from an expensive alloy steel to plain carbon, Oliver Corporation cites many other advantages.

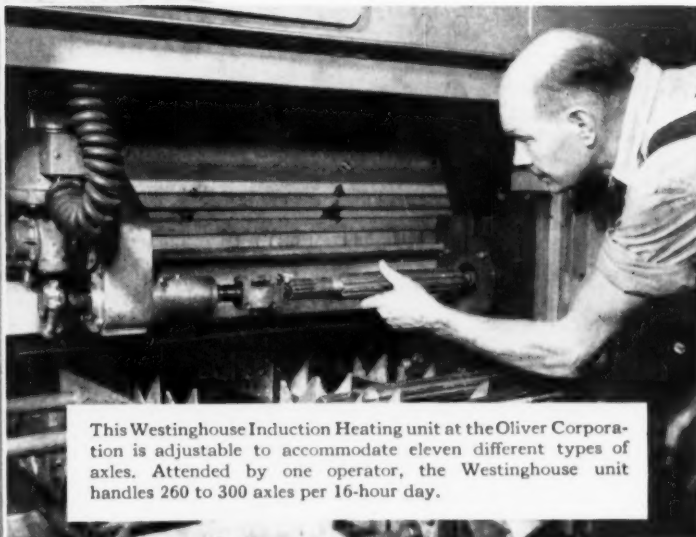
They say that with Westinghouse Induction Heating there is less distortion, therefore faster operation . . . 100% better control of case depth and many savings from the standpoints

of operating and manufacturing. According to the Oliver Corporation, the Westinghouse Induction Heating units have "revolutionized our methods of heating."

PUT YOUR HEATING ON A PUSHBUTTON PRODUCTION LINE BASIS

For hundreds of plants, Westinghouse engineering has produced integrated induction heating equipment which is successfully handling highly specialized metallurgical and production requirements. Westinghouse Induction Heating can put the *exact* heat you want *exactly* where you want it—day after day, week after week, without variation.

YOU CAN BE SURE...IF IT'S Westinghouse



This Westinghouse Induction Heating unit at the Oliver Corporation is adjustable to accommodate eleven different types of axles. Attended by one operator, the Westinghouse unit handles 260 to 300 axles per 16-hour day.

WITH WESTINGHOUSE INDUCTION HEATING

BUT MAYBE INDUCTION HEATING IS NOT FOR YOU...LET'S FIND OUT

Telephone collect EDmonson 6-2300, or return this coupon to SALES MANAGER, Industrial Electronics Dept., Westinghouse Electric Corporation, P. O. Box 416, Baltimore 3, Maryland.

I believe that we qualify for Westinghouse Induction Heating.
Please have your engineer call. _____ Please send literature. We make _____ (item) from _____ (metal or alloy). Each piece is approx. _____ (size) and weighs approx. _____. We work in temperature range of _____ and handle approx. _____ per hour. We are interested in: _____ Forging _____ Hardening _____ Joining _____ Other. _____
Please describe briefly _____

Please check below the Westinghouse Induction Heating advantages you believe are superior to your present process.
_____ Selective heat _____ Safety
_____ Instantaneous heat _____ Consistent results
_____ Minimum scale _____ Production-line heating

Name _____ Title _____
Company _____
Street & No. _____
City & State _____

WORLD'S LARGEST STOCK 52100 STEEL Peterson STEELS, INC.

Union, New Jersey • Detroit, Michigan • Melrose Park, Illinois

EXHIBITS, MEETINGS

(Continued from P. 13)

Hotel, Detroit. Society headquarters, 27 East Monroe St., Chicago 3.

Manufacturing Chemists' Assn.—Semi-annual meeting and winter conference, Nov. 26, Hotel Statler, New York. Society headquarters, 1625 Eye St., N. W., Washington 6, D. C.

DECEMBER

American Society of Mechanical Engineers—Annual meeting, Dec. 1-6, Statler Hotel, New York. Society headquarters, 29 W. 39th St., New York 18.

Electric Overhead Crane Institute—Annual meeting, Dec. 3, Statler Hotel, Washington, D. C. Society headquarters, One Thomas Circle, Washington 5, D. C.

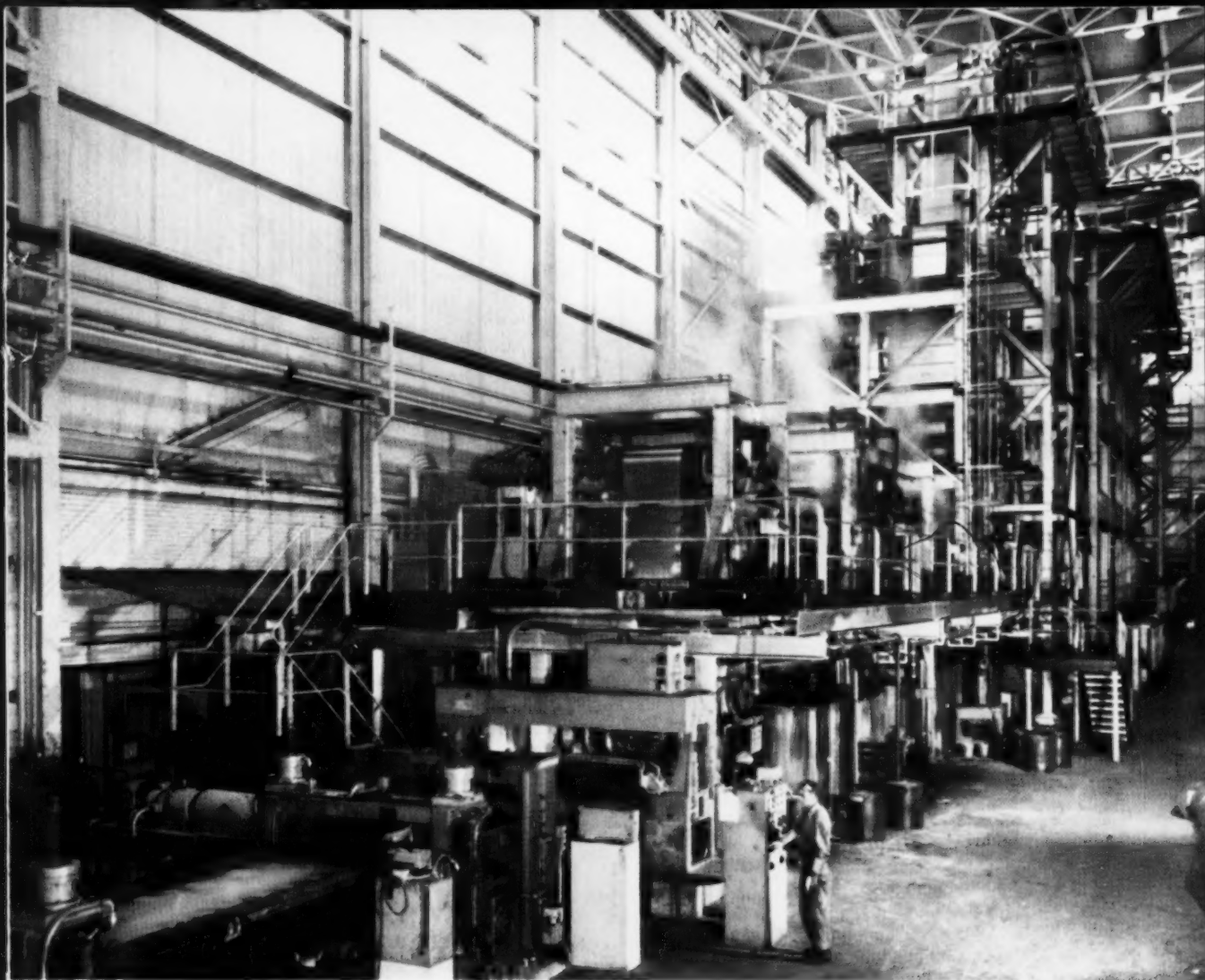
American Institute of Mining, Metallurgical, and Petroleum Engineers—Fifteenth annual conference on electric furnace steel, Dec. 4-6, Penn-Sheraton Hotel, Pittsburgh. Society headquarters, 29 West 39th St., New York 18.

National Assn. of Manufacturers—Annual meeting, Dec. 5-7, Waldorf-Astoria, New York. Society headquarters, Two East 48th St., New York.

American Institute of Chemical Engineers—Annual meeting, Dec. 8-11, Conrad Hilton Hotel, Chicago. Society headquarters, 25 W. 45th St., New York.

IRE, ACM, AIEE—1957 Eastern joint computer conference and exhibit, Dec. 9-13, Sheraton - Park Hotel, Washington, D. C. Information: IBM Corp., 1220 Nineteenth St., N. W., Washington, D. C.

The Material Handling Institute—Annual meeting, Dec. 10-11, Biltmore Hotel, New York. Society headquarters, One Gateway Center, Pittsburgh.



Continuous ANNEALING LINES...

• This is one of several Continuous Annealing Lines designed and built by Aetna-Standard. The line processes 48" wide strip maximum at 1000 feet a minute at Dominion Foundries and Steel, Limited, Hamilton, Ontario, Canada. This line has been designed so that the Annealing Furnace can be bypassed and strip run through for cleaning only.

Like Continuous Galvanizing or Tinning, a Continu-

ous Annealing Line requires efficient design and rugged equipment. As a pioneer in Continuous Lines and other equipment for processing sheet and strip, Aetna has broad experience in the design of equipment required for your specific application.

Our Sales Engineering Staff is available for consultation to help analyze your requirements upon your request.

AETNA • STANDARD

THE AETNA-STANDARD ENGINEERING COMPANY

GENERAL OFFICES: PITTSBURGH, PA.

PLANTS: ELLWOOD CITY, PA., WARREN, OHIO

CONTINUOUS GALVANIZING LINES • CONTINUOUS ELECTROLYTIC TINNING LINES • SIDE TRIMMING AND SHEAR LINES AND OTHER FINISHING EQUIPMENT • CONTINUOUS BUTT WELD PIPE MILLS • SEAMLESS TUBE MILLS • DRAWBENCHES AND OTHER COLD DRAW EQUIPMENT • ROLLS AND CASTINGS • EXTRUDERS, MILLS, PRESSES FOR RUBBER AND PLASTIC



**Color...precision...prompted
to switch to Alcoa Aluminum***

These jewel-bright buttons on Square D's oiltight pushbutton line command machine tools, move assembly lines, guard lives and sensitive processes. Their colors tell at a glance the functions they perform. Their precision, $\pm .0005"$, keeps them oiltight and smooth working for years.

Square D switched to Alcoa® Aluminum Screw Machine

Stock for these parts . . . because metal is desirable to withstand abuse . . . because color anodizing provides a bright, lasting finish that does not distort dimensions . . .

because the fine machine finish possible with Alcoa 2011-T3 (10-20 microinches) gives them the precision they need. Above all, costs are lower than any other metal they could have used.

If you machine parts from brass or steel, now is the time to take a hard look at these economic facts about aluminum:

1. Aluminum costs less than brass, and machines just as fast.
2. Aluminum machines faster than steel and won't rust.
3. Aluminum scrap allowance is high.

Now is the time to switch to Alcoa Aluminum. To help you make that switch, call your nearest Alcoa sales office. For immediate delivery of screw machine stock, contact your nearest Alcoa distributor or ALUMINUM COMPANY OF AMERICA, 870-L Alcoa Bldg., Pittsburgh 19, Pa.

SQUARE D COMPANY

Screw Machine Stock

IN PURCHASING,

Howard W. Troyk, Square D's Purchasing Agent (left), discusses Alcoa service with Jack Mayotte of Production Planning. Mr. Troyk says, "We decided on Alcoa Aluminum Screw Machine Stock because Alcoa helped us in solving many of the problems encountered with various applications. Trial lots of material were willingly submitted and requested delivery dates were met."



IN DESIGN,

Paul Goudy, Chief Engineer (left), discusses application of aluminum screw machine parts with designer Earl Mekelburg. Mr. Goudy says, "We selected Alcoa Aluminum for our pushbutton because of its fine combination of strength, consistency of color when anodized, and substantial cost saving!"

**ALCOA ALUMINUM
SCREW MACHINE
STOCK**



NEW! "ALCOA THEATRE"
Exciting Adventure
Alternate Monday Evenings



***LEARN WHY OTHER COMPANIES HAVE
SWITCHED TO ALCOA ALUMINUM**

Direct quotes from leaders in industry on why they buy from Alcoa. Fill out coupon for your copy.

Name _____
Title _____
Company _____
Address _____
City _____ State _____

Solve Respiratory Problems
Simply with



**R5000 Series
Respirator**

14 Respirators in One

(American Optical R5000 Series Respirator)




If your plant has two to fourteen respiratory hazards you *don't* have to buy two to fourteen different respirators! The AO R-5000 Series will give you quality protection against a multitude* of dust, mist, fume, and gas hazards (singly or in combination) at the cost of *just one* basic face piece and the necessary cartridges and filters. Quick interchangeability does it!

*Nuisance, toxic and pneumoconiosis-producing dusts, acid gases, organic vapors, alkali gases, metal fumes, radioactive particulate matter, pneumoconiosis-producing mists and ammonia.

American Optical
COMPANY
SAFETY PRODUCTS DIVISION

Always insist on AO Trademarked
Safety Products. Your nearest American
Optical Safety Products Representative
can supply you.

SOUTHBRIDGE, MASSACHUSETTS
Branches in Principal Cities



You get more
than **Quality**

when you specify
Jessop
high-speed steel

When you need a special steel that cuts fast and deep and stays sharp even when very hot, it's pretty certain you'll ask for "high-speed." And if you're looking for assurance of top quality, you are apt to name by name a company that pioneered in the business of making high-speed steels, contributed materially to their development, and has lab and quality-control techniques well ahead of the field. You're apt to specify Jessop.

But you get more than quality when you specify Jessop high-speed steel. You get good service for two very good reasons. First, Jessop has the capacity to supply demand promptly. It can produce more high-speed products, (namely sheets, plates, bars, forgings, castings and special shapes), at one location than any other company in America. And second, Jessop wants all the high-speed steel business it can get and bends over backwards to please its customers. Send in an order and you'll find out.

JESSOP

STEEL COMPANY • WASHINGTON, PA.

OFFICES IN PRINCIPAL CITIES

Wholly-owned Subsidiaries: Jessop Steel of Canada Limited, Wallaceburg, Toronto
Jessop Steel International Corp., Chrysler Building, New York, New York Green River Steel Corporation, Owensboro, Kentucky



PHILADELPHIA SLAG COMPANY
DIVISION OF ADAMS PRODUCTS CORPORATION
Producers of
CRUSHED SLAG and BITUMINOUS CONCRETE
SWEDELAND, Pennsylvania

IN QUANTITY
WRITE FOR CATALOG
PHILADELPHIA, PA.
JAMES H. BROWN
MANAGER

June 28, 1956.

**"Paid for itself in
two years operation"**



Plymouth Locomotive Works
Fate-Root-Heath Company
Plymouth, Ohio

Gentlemen:

In February of 1954, we put into service a 35-ton Plymouth Diesel Hydraulic Locomotive, to haul battleship cars of slag from the slag bank to our plant. This locomotive replaced a 70-ton six wheel steam locomotive.

The Plymouth Diesel has done our work most satisfactorily and at a great saving in the cost of operation. The steamer required 3 to 5 tons of coal per day, while the Plymouth Diesel, doing the same work as the steamer, consumes approximately 75 gals of fuel per week.

The savings effected by the use of the Diesel to date, have equalled the cost of the new locomotive. We are very well pleased that we made the change from steam to Plymouth Diesel.

Yours very truly,

Robert F. Peters
Robert F. Peters, Supt.

*Plymouth Torqomotive
half as big as former
locomotive*

*Hauls same loads but
saves over \$1000 in
fuel monthly*

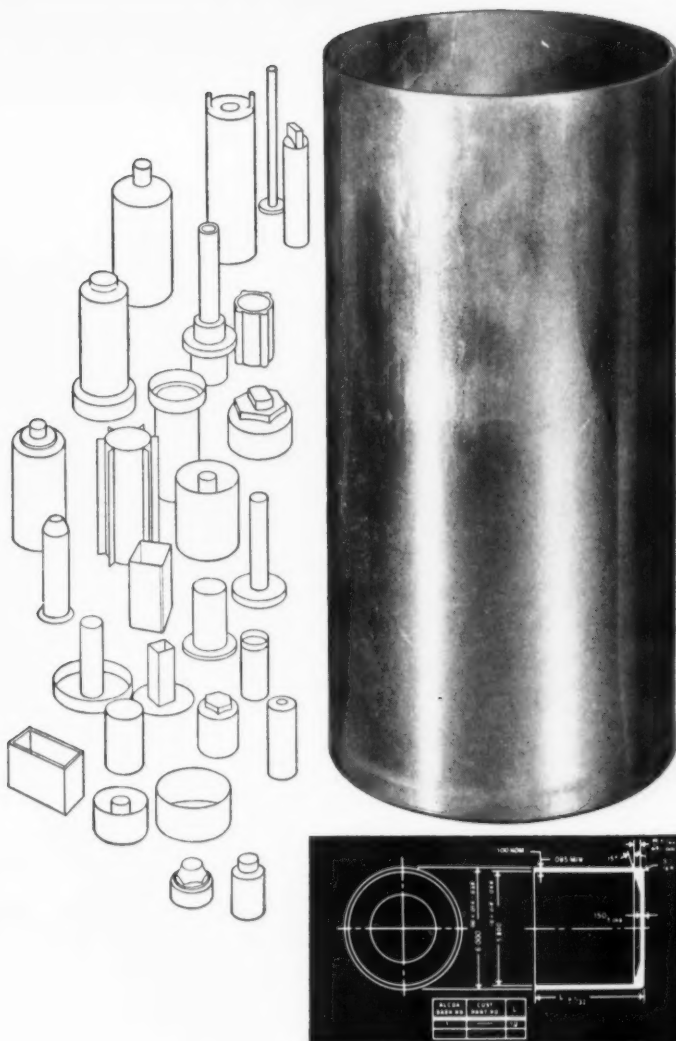
*Pays for itself
in 28 months*

Maybe a Plymouth can do the same for you. Find out. Send a brief outline of your haulage needs for recommendation. Address: Plymouth Locomotive Works, The Fate-Root-Heath Company, Dept. A-2, Plymouth, Ohio.

ALSO BUILDERS OF F-R-H CERAMIC MACHINERY

**PLYMOUTH®
LOCOMOTIVES**

WITH TORQOMOTIVE DRIVE



this ALCOA IMPACT solved a designer's problem

This large container represents the basic form of impact extrusion. Fabricated in one stroke of the press (as are all impacts), this part looks simple but would present problems if made by any other process. It is noteworthy on at least two counts to designers fighting to reduce material and fabricating costs:

First: it is a chest thumper for the designer who conceived it, because it reduces the cost of the part to one-fourth of the original estimate for other materials and conventional methods of fabrication. Its strong, seamless, easy-to-clean construction fits exactly the requirements for service as a sugar dispenser in an automatic coffee vending machine. *Second:* it is the largest diameter impact we are currently producing and gives you some idea of how big an impact can be. Large or small, simple or intricate, all impacts are com-

pletely fabricated in a fraction of a second with just one stroke of the press.

Sound too easy? Well, this is only the beginning. Using exactly the same techniques we can punch round, oval, square or special shapes. We can incorporate ribs, splines, flutes or other functional or decorative longitudinal patterns, on the inside or outside. In fact, just about any closed end tubular part or cup-shaped part should be considered as an Alcoa® Impact. We don't know what we'll be working on next. We'd prefer to be limited only by your imagination.

To get your thinking started, send for Alcoa's design manual, *Alcoa Impacts—Metal in Motion*. For immediate help with any problems, call your Alcoa sales engineer. You'll find the nearest Alcoa sales office listed under "Aluminum" in the Yel-

low Pages of your phone book. Aluminum Company of America, 1997-L Alcoa Building, Pittsburgh 19, Pa.

Some Impact Rules of Thumb— Check your problems against this list:

1. Parts requiring hollow sections—either tube or cup-shaped with one end closed.
2. Parts with walls or surfaces requiring zero draft.
3. Parts requiring lengths up to eight or ten times the diameter.
4. Parts requiring the strength of forgings.
5. Parts requiring tolerances down to ± 0.0005 .
6. Parts requiring ribs, bosses or fins as integral parts.
7. Parts requiring low unit cost in mass production. (Often the savings in machining, fabrication and assembly made by impacts amortize tooling in relatively short runs.)

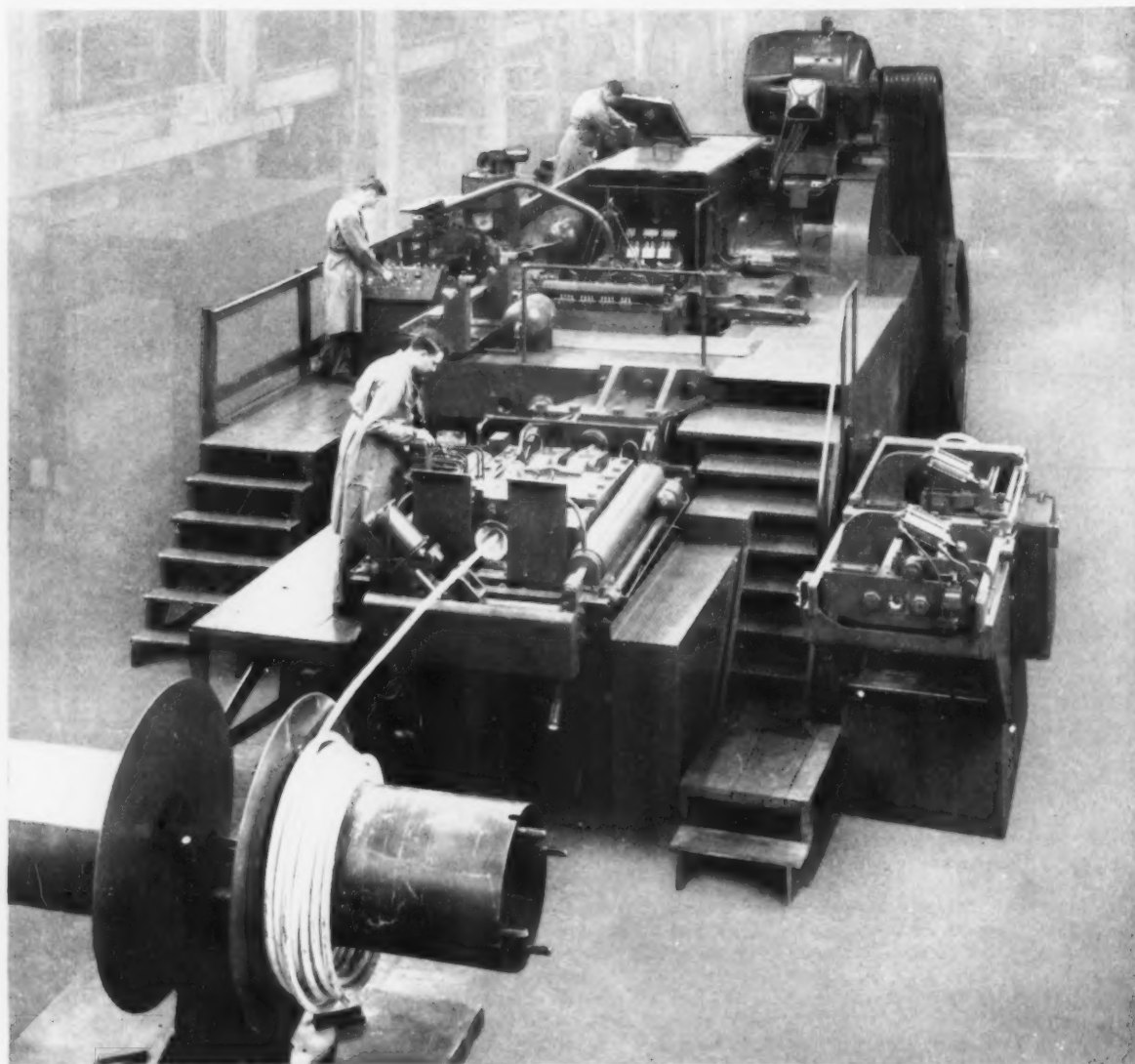


NEW! "ALCOA THEATRE"
EXCITING ADVENTURE
ALTERNATE MONDAY EVENINGS

YOUR GUIDE
TO THE BEST
IN ALUMINUM
VALUE



**Cleveland Cap Feeds This Biggest
13 Minutes and Produces *494***



THE 1-1/4-INCH BOLTMAKER

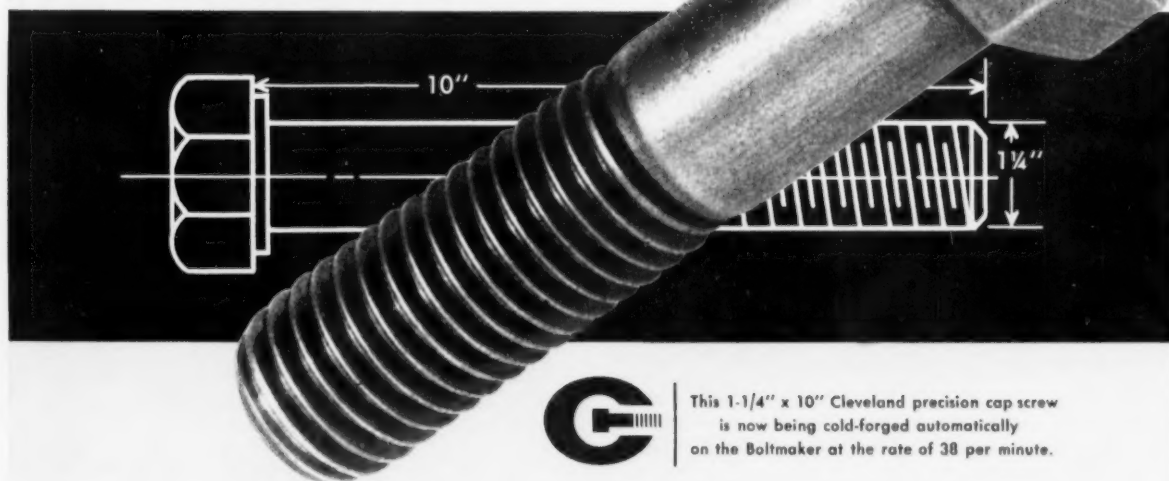
WEIGHT: 400,000 POUNDS

MOTOR HORSEPOWER: 200

PIECES PER MINUTE: 38

Boltmaker One Ton of Steel Every Four-Pound Cap Screws . . .

20 Times Faster!



This 1-1/4" x 10" Cleveland precision cap screw is now being cold-forged automatically on the Boltmaker at the rate of 38 per minute.

This tremendous 1-1/4" Boltmaker opens new horizons in the automatic cold-forging of metal components. It is the largest machine of its kind ever built, four times larger than its immediate predecessor, the 3/4" Boltmaker.

We pioneered this first 1-1/4" Boltmaker for The Cleveland Cap Screw Company. Specialists since 1916 in cap screws, set screws, studs and fasteners, including "larger than usually listed sizes," Cleveland Cap is now relying on its new 1-1/4" Boltmaker for the exacting task of producing the large cap screws illustrated above.

In this forging operation, the Boltmaker draws the steel rod to size, cuts it to proper length, extrudes the blank, heads, trims the head, points the end and rolls the threads,

all automatically! All operations occur at one time and a complete, ready-to-use cap screw is cold-forged on each stroke of the machine. Grain flow in the head and threads is symmetrical and unbroken. The part is stronger because the forging action increases fatigue resistance and tensile strength.

This giant Boltmaker can be tooled to cold-forge many other large-size special products.

Whether your forging problem is one of making four-pound precision cap screws or a wide variety of other metal components in various sizes, we invite you to send us your prints and samples. Better yet, pay us a visit, and discuss with us how the latest methods, machines and ideas fit into your future metalworking production.

NATIONAL

MACHINERY COMPANY

TIFFIN, OHIO—SINCE 1874

DESIGNERS AND BUILDERS OF MODERN FORGING MACHINES • MAXIPRESSES • REDUCEROLLS • COLD HEADERS • BOLTMAKERS • NUT FORMERS • TAPPERS • NAILMAKERS

Hartford

Detroit

Chicago

An important question for every steel maker:

What is Periclase?

This brief report, which uses no highly technical formulas, answers the question "What Is Periclase" in a concise discussion of (a) the mineral make-up of Periclase as compared to other magnesia materials, (b) why Periclase characteristics make it superior to other magnesias for high performance steel industry applications, and (c) how Periclase is produced by Kaiser Chemicals as the primary ingredient of basic refractories used by the steel industry.

The differences between Periclase and other magnesia materials used for basic refractories are more important to steel makers than to any other group of people.

Why?—first, because the steel industry is the nation's largest user of basic refractory products. *Second and even more important*, because the quality of refractories used has a direct effect on steel-production efficiency. Thus, the quality of the materials in the refractory products he buys is the individual concern of every steel producer.

Magnesia-Bearing Minerals Plentiful In Earth

Magnesia, (magnesium oxide), long known for its excellent physical and chemical properties in basic refractory use, is plentiful in natural forms in the earth. But in its natural form, such as found in brucite, dolomite and magnesite, it is almost always found combined with additional oxygen, lime, water and mineral impurities. These additional materials weaken or destroy many of the chemical and physical properties that make magnesia a good refractory.

On the other hand, natural forms of *pure crystalline* magnesia—known as Periclase—are rarely found in the earth. To obtain commercial quantities, it must be produced synthetically.

Periclase vs. Magnesite In Refractories

A closer comparison between Periclase and one of the commonly used natural materials—Magnesite—will show the nature of the difference in materials . . . and how these differences affect refractory performance.

A single grain of either Periclase or magnesite the size of a grain of coarse sand is composed of several thousand tiny magnesium oxide crystals. In both cases, these crystals are held together as a grain by some form of bond or bonding ingredient.

The manner in which the individual MgO crystals are bonded together into grains determines their ultimate performance in refractory service.

How Magnesite Impurities Form Grain Bond

To obtain deadburned magnesite grains, natural magnesite ore (mostly magnesium carbonate) is processed by calcining. Impurities such as lime, silica and iron act as fluxes in the sintering kiln. Burned at temperatures of about 2750° F., most of the carbon is released in the form of carbon dioxide gas, leaving a brownish residue of magnesite grains.

Although calcining raw magnesite crystallizes the MgO and releases the carbon, *it does not remove the*

random impurities present in the natural ore. During the calcining process, these impurities soften or liquefy and form a coating around the MgO crystals. When the temperature is lowered at the completion of the calcining operation, these coatings harden and form a glass-like cement which bonds the crystals into grains.

The resulting magnesite grains are composed of 80-90% MgO crystals and 20-10% other minerals which have combined to form the glassy bond.

How "Impurities Bond" Affects Performance

Although MgO crystals can withstand temperatures of over 5000° F. without appreciable change, the glassy bond formed by the impurities cannot. Even at relatively low temperatures, these impurities again soften or liquefy and lose their ability to hold the MgO crystals together, permitting them to fall apart under stress (with the liquids even acting as a lubricant!).

As with the weakest link of a chain, the degree to which deadburned magnesite grains can withstand high temperature, physical stress and chemical attack is *determined by the low-melting impurities* rather than by the highly refractory MgO.

How Periclase Is Obtained From Sea Water

Of the several ways to obtain Periclase, one of the most efficient is the sea water process developed and used by Kaiser Chemicals. Because magnesium is present in sea water as magnesium chloride (a salt), magnesium hydroxide is precipitated when sea water is reacted with calcined dolomite.

This hydroxide is then thoroughly washed in fresh water to remove the calcium chloride and other soluble impurities. Finally, the pure magnesium hydroxide* is passed through filters to remove much of the excess water, and the resulting paste (known as filter-cake) is fed into high-temperature kilns for calcining.

Two Methods For Producing Periclase Grains

The fact that Periclase is synthesized allows us to control and vary the manufacturing process to produce a "custom made" product.

Standard high purity Kaiser Periclase (92% MgO) is produced by adding a small, precisely-controlled amount of very fine pure silica (SiO₂) to the filter-cake just before it is fed into the kiln. During the calcining operation the silica reacts with a portion of the MgO to form magnesium orthosilicate. This highly refractory mineral bonds the individual MgO crystals into grains.

Magnesium orthosilicate is an excellent bonding material. *At this hydroxide stage it is similar to the milk of magnesia used for toothpastes and medicinal purposes.

FOUR PRIMARY STEPS IN PRODUCTION OF PERICLASE FROM SEAWATER



1

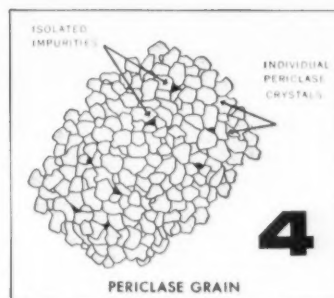


2



3

- 1 When granular dolomite is added to treated seawater in this reactor, magnesium hydroxide is precipitated, washed and processed through several thickeners.
- 2 Next step is the vacuum filter where excess water is removed. The resulting "filter cake" is discharged on a screw conveyor for movement to kiln.
- 3 At the kiln, patented mineralizers are added to the filter cake. Under heat, these additives cause chemical reactions which bond MgO crystals into Periclase grains.
- 4 For extremely high purity Periclase, a chromium compound is added to the filter cake. This additive—under extreme heat—causes MgO crystals to lock themselves together in a "crystal bond" (no liquid phase) to form high density, low porosity Green Grain Periclase.



terial as it is similar in many respects to MgO itself. In contrast to a glassy magnesite bond, subsequent cooling or reheating does not shrink or liquefy this crystalline bond.

In addition, unusually high kiln temperatures are used in the production of Kaiser Periclase. These high temperatures cause individual crystals to combine into larger, more stable crystals. At the same time, the intense heat reduces the overall mass by shrinking the newly formed grains. In passing through the hottest point in the kiln (3300°F.) this mass is shrunk to its maximum density and minimum porosity. The result is a dense, high purity Periclase grain of very low porosity and exceptional volume stability.

Second Method Produces "Crystal Bond"

For very severe applications, Kaiser Chemicals engineers developed an even higher purity Periclase grain—96% MgO. Known as Green Grain Periclase, it is produced by adding a minute amount of chromium compound to the filter cake as it is being fed into the kiln for calcining. The effect of this patented mineralizer is to induce a phenomenal recrystallization.

Influenced by extreme heat during the calcining operation, this additive sets up stresses within each MgO crystal which cause the crystal to send out uneven projections of itself. These projections interlock with similar projections of adjacent crystals. No melting occurs, no liquids are formed. The result is a recrystallized homogeneous mass of MgO crystals tightly interlocked into a highly refractory Periclase grain of highest density and lowest porosity . . . ideal for the most severe refractory applications!

* * *

The foregoing discussion, although greatly simplified, points out the principal differences between magnesite and Kaiser Periclase. The magnesite bond, formed from impurities carried in natural ore and by added fluxing agents, is weak at use temperatures and unable to withstand the effects of high temperatures and chemical attack. Kaiser Periclase, being synthesized from high-

purity MgO, permits the bond to be pre-determined and controlled. The resulting highly refractory crystalline bond is stable and can resist chemical attack almost to the same degree as the MgO crystal itself.

Kaiser Chemicals refractory specialists, backed by more than 15 years of continuous research and development, are producing special refractory compositions that assure open hearth and electric furnace operators peak performance in specific applications. These products are available for fast delivery to all parts of the United States from plants at Natividad and Moss Landing, California, and Columbiana, Ohio.

If you have a problem in your mill that might be solved by the prompt delivery of superior quality, dependable basic refractories, a Kaiser Chemicals field representative will be pleased to give you detailed information and immediate engineering assistance.

Kaiser Chemicals

Pioneers In Modern Basic Refractories

REFRACTORY BRICK & RAMMING MATERIALS • CASTABLES & MORTARS
MAGNESITE • PERICLASE • DEADBURNED DOLOMITE

Call or write Kaiser Chemicals Division, Dept. S7161, Kaiser Aluminum & Chemical Sales, Inc., at any of the Regional Offices listed below:

PITTSBURGH 22, PA. 3 Gateway Center
HAMMOND, IND. 518 Calumet Building
OAKLAND 12, CALIF. 1924 Broadway

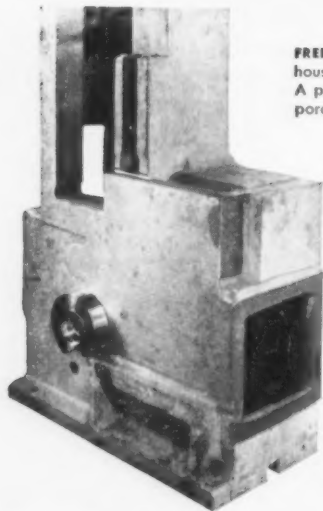
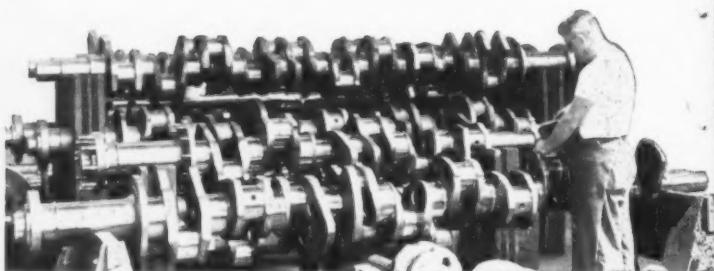
Kaiser Chemicals Basic Refractories for the Steel Industry

Kaiser PERICLASE (D-S) Kaiser PERICLASE-CHROME Brick
Kaiser CHROME-PERICLASE Brick Permanente 165 Ramming Mix
Permanente 84 Ramming Mix

MACHINABILITY—Die sets for the metal stamping industry must be accurately machined. The highly uniform distribution of chemical elements in Chateaugay produces a fine, dense grain structure resulting in excellent and economical machining. Dense grain structure also reduces loss rate caused by flaws.



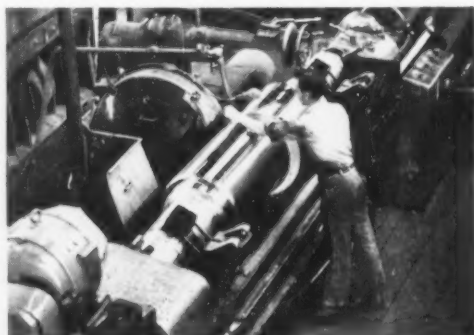
Chateaugay Pig Iron



FREEDOM FROM POROSITY—This end-frame housing for a power-squaring shear holds oil. A prime casting requirement is freedom from porosity—plus density, strength, wear-resistance. Using Chateaugay, the manufacturer produces castings with uniform soundness, close grain structure, strength, toughness, maximum resistance to wear.

WEAR-RESISTANCE—Chateaugay has been found ideal by foundries producing rolls used in making paper, plastics, rubber, and metals of all kinds. The exclusive inherent chemistry of Chateaugay tends to disperse the fine graphite flakes, producing a finer, condensed grain structure that gives the rolls increased wear-resistance and strength.

MINIMUM BRITTLENESS—A crankshaft manufacturer selected Chateaugay for three reasons: (1) Chateaugay reduces the combined carbon, thereby minimizing brittleness while still maintaining required physicals; (2) Chateaugay adds machinability; (3) Chateaugay reduces the possibility of porosity in the crankshaft casting.



FAST ON-SITE ERECTION with Truscon's new "Budget Buildings". Simplified design brings the cost down low. It's a quality steel building with a tight, dense, galvanized coating that needs no painting. Your "Budget Building" order will be filled fast from off-the-shelf stocks. Send coupon for details.

REPUBLIC MATERIALS HANDLING EQUIPMENT meets rugged service requirements. These PB-130 Box and Skid Units are used to move castings from foundry to machining line, then to storage for future use. Design and construction features assure long service life at lowest-per-year cost. Send coupon for facts.



REPUBLIC



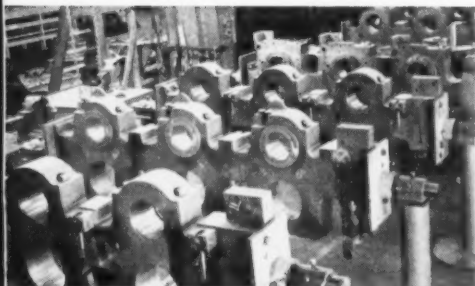
World's Widest Range of Standard Steels

meets all these casting requirements

Chateaugay, Republic's exclusive premium pig iron, is used in the nine casting applications illustrated on these pages. It was selected to meet nine different and specific requirements, ranging from high strength and machinability to wear-resistance and dimensional accuracy in ductile iron.

Properties and characteristics of Chateaugay are unequalled by any domestic pig iron. For over 50 years it has helped foundrymen lick difficult casting jobs. It is exceptionally fluid—fills adjoining light and heavy sections completely—produces tough, sound castings accurate to patterns and shapes.

A Republic Pig Iron Metallurgist will show you how the uniform chemistry of Chateaugay, the low-phosphorus, copper-free pig iron, can help you produce consistently high-quality castings time after time. There's no obligation. Just mail the coupon.



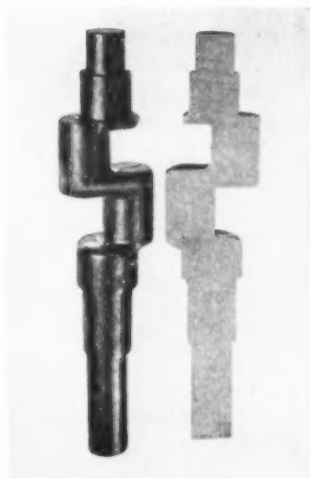
HIGH STRENGTH—Modern printing press design must provide both strength and extreme accuracy. That's why manufacturers specify Chateaugay for cast parts, such as the side-frames shown left. Chateaugay gives them the needed strength, plus fine grain structure for better and more accurate machinability.



HEAT-RESISTANCE—This chill or trough is used in directing the flow of molten chromium. Cast surfaces must withstand thermal shock, and must be highly resistant to corrosion. Chateaugay meets these requirements and also imparts an unusually fine grain structure with high wear-resistance.



LOW LOSS-RATE—A foundry producing glass molds keeps its loss-rate under 1% by using Chateaugay in every heat, including heats of nodular iron. The company's experience has proved that there is no better nor more economical means for insuring flaw-free, easy-to-machine castings.



FINE, UNIFORM GRAIN STRUCTURE—Cut-away shows excellent interior and exterior quality of a shell-molded, ductile iron crankshaft made with Chateaugay as the base metal. Chateaugay's very high carbon and unusually low sulphur, phosphorus, and manganese content make it ideal for ductile iron use. Its excellent physicals are maintained in the ductile form, assuring consistent top-quality castings.



DIMENSIONAL ACCURACY—Chateaugay was used as the base metal in this ductile iron sprocket and bevel gear. Photo reveals an exceptionally good surface. By using Chateaugay and the shell mold process, final machining was held to an absolute minimum.

STEEL

and Steel Products

REPUBLIC STEEL CORPORATION
DEPT. C-4110A
3104 EAST 45TH STREET • CLEVELAND 27, OHIO

- ☐ Have a Pig Iron Metallurgist call.
- Send more information on:
- ☐ Truscon "Budget Buildings"
- ☐ Materials Handling Equipment

Name _____ Title _____

Company _____

Address _____

City _____ Zone _____ State _____



heavy-duty planing

The Gray Universal is the world's most powerful planer available for conventional planing. Its rigidity and speed are ideally suited for modern carbide cutting.



double-cutting

The flick of a lever, the touch of a button permits double-cutting. Elimination of the idle stroke insures the world's most efficient flat surface machining. Only simple carbide tools are required.



triple-cutting

Rough and rough-finish plane at the same time. Rough by double-cut planing and simultaneously rough-finish with a single point tool. Then finish plane without a tool change.



cross planing

Eliminates extra settings by cross planing the occasional keyways, chamfered corners, and other troublesome small cross surfaces that formerly added hours to your set-up time.

a

GRAY

This new 84" x 60" x 18' Gray Universal Planer shown in operation at the Koppers Co., cuts going - cuts coming, removes big chips at double rate. There is no idle return stroke to waste precious production hours. Instantaneous reversals with heavy duty double-cutting make this the first REAL new development in modern planers ... a GRAY exclusive.

Double tables further virtually eliminate the costly set-up time required by ordinary planers.

The multiple savings received by users of the new Gray Universal make it a wise investment.

If it's new... it must be a GRAY.

The G. A. GRAY Co.,
Cincinnati, Ohio

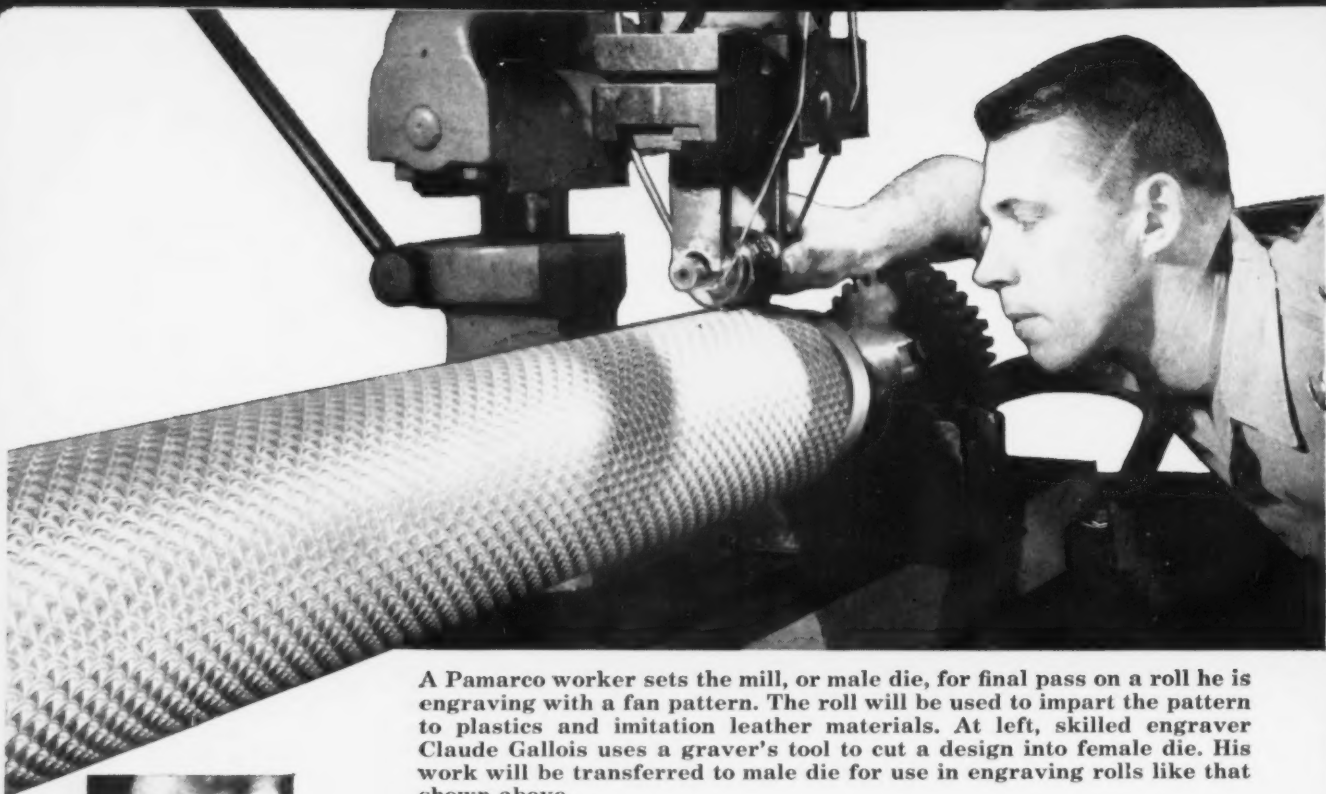




GRAY

GRAY Universal Planer shown in operation
at the Baltimore plant of Koppers Company, Inc.,
Metal Products Division.

new planer



A Pamarco worker sets the mill, or male die, for final pass on a roll he is engraving with a fan pattern. The roll will be used to impart the pattern to plastics and imitation leather materials. At left, skilled engraver Claude Gallois uses a graver's tool to cut a design into female die. His work will be transferred to male die for use in engraving rolls like that shown above.



Steel Tubing With Glamour

Pittsburgh Tubes Meet Exacting Pamarco Tests

Steel tubing is glamourized at Paper Machinery & Research, Inc., with engravings so intricate they are checked on a 600-power microscope.

Cold-drawn seamless mechanical tubing from Pittsburgh Steel Company is given a beauty treatment at Pamarco's Roselle, N. J., plant to achieve patterns like those pictured here.

Pamarco and its supplier, A. B. Murray Company of Elizabeth, N. J., rely on Pittsburgh Tubes to meet exacting requirements.

Pamarco makes and engraves all kinds of industrial rolls for flexographic and gravure printing, paper converting, plastics manufacturing and textile plants.

Many manufacturers of printing presses, paper converting machinery and plastics processing equipment install Pamarco rolls as original equipment. In addition, the company re-engraves rolls, rebuilds them and provides fast engineering help on industrial roll applications.

Making micro-precision rolls for such varied uses as laminating, printing, coating, embossing, ink transferring and a multitude of other duties calls for precise engineering, rigid quality control, accurate machining and finish grinding.

In every operation, quality of the steel is basic.

From the large stocks in the A. B. Murray warehouses come Pittsburgh Steel tubes of the high, uniform quality which Pamarco must have to produce the best possible industrial rolls at economical prices.

The close relationship between Pamarco and A. B. Murray is based on not only steel but also on fast, dependable service.

The service given by A. B. Murray is backed up by

the dependable tubes furnished by Pittsburgh Steel which meet these requirements, as outlined by Pamarco General Manager David Killary:

- **No inclusions or seams** are permitted since a defect can mean scrapping a cylinder during machining or engraving. Mr. Killary said:

"We've had a very favorable relationship with A. B. Murray. We've had fewer inclusions, for example. Consequently, A. B. Murray has become a prime supplier. Their service is tops."

- **Grain structure** of the steel is closely checked at Pamarco. Uniformity in grain is a must since rolls are ground and re-engraved many times through the years. Hard spots or other sub-surface defects mean the possibility of ruin to expensive engravers' tools.

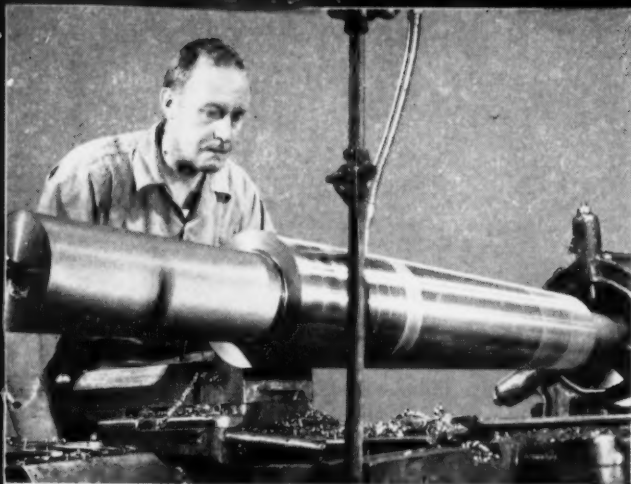
Machinability is vital. Tubes that are out of balance are difficult to grind concentrically. While Pamarco dynamically balances every cylinder to insure trouble-free performance, the company says "we find Pittsburgh tubes require a minimum of balance correction."

- **Size tolerances** on tubes are another important factor. Oversized tubes require extra machining, which runs up costs. Undersize tubes may make it impossible to complete machining operations and hold to size.

If tubes are not straight, or have high or low spots, or if they belly in the middle, then it is necessary to buy tubing well oversize in order to clean up the surface to the required diameter.

Quality of the steel is demonstrated by the quality control checks made on tubes as they progress through the shop and in final inspection.

Pamarco uses a battery of high-powered optical mi-



Uniform concentricity and wall tolerances of Pittsburgh tubing pay off in machining 7 1/4-inch OD tube to 6.983 as it assumes proportions of printing roll.



Final check on ink transfer roll made from quality Pittsburgh seamless involves close inspection of design. Inspector at left checks overall design while partner uses gravurescope to check width and depth.

croscopes to check the engravings on steel cylinders. The depth of the engravings is checked, for example, on a 600-power gravure microscope. Concentricity and balance also come in for close examination to make sure they meet rigid standards.

Where quality of the steel is important and where good, dependable warehouse service is essential to manufacturing, the best team is the tube mills of Pittsburgh Steel and a responsible, quick-to-move warehouse.

If you have tubing problems that need good steel and good warehouse service, pick out the closest distributor to you from the list at the right and act now. Put in a telephone call and you've got real help on its way to you—fast!



Close contact between A. B. Murray salesman Jack Fischer (right) and veteran warehouse manager Frank Grippo, insures steady flow of Pittsburgh tubes to Pamarco's plant from racks at Murray's Elizabeth, N. J., warehouse.

Pittsburgh Seamless Distributors

Baker Steel & Tube Company
Los Angeles, California

Chicago Tube & Iron Company
Chicago, Illinois

Cleveland Tool & Supply Co.
Cleveland, Ohio

Drummond McCall & Co., Ltd.
Montreal, Quebec, Canada

Edgcomb Steel Company
Philadelphia, Pennsylvania

Gilmore Steel & Supply Co.
San Francisco, California

Earle M. Jorgensen Co.

Perry Kilsby, Inc.
Los Angeles, California

Mapes & Sprowl Steel Co.
Union, New Jersey

Metal Goods Corporation
St. Louis, Missouri

Miller Steel Company, Inc.
Hillside, New Jersey

A. B. Murray Co., Inc.
Elizabeth, New Jersey

C. A. Russell, Inc.
Houston, Texas

Ryerson, Joseph T. & Son, Inc.
Chicago, Illinois

Solar Steel Corporation
Cleveland, Ohio

Steel Sales Corporation
Chicago, Illinois

Tubular Sales
Detroit, Michigan

Ward Steel Service Company
Dayton, Ohio

Pittsburgh Steel Company

Grant Building • Pittsburgh 30, Pennsylvania



District Sales Offices

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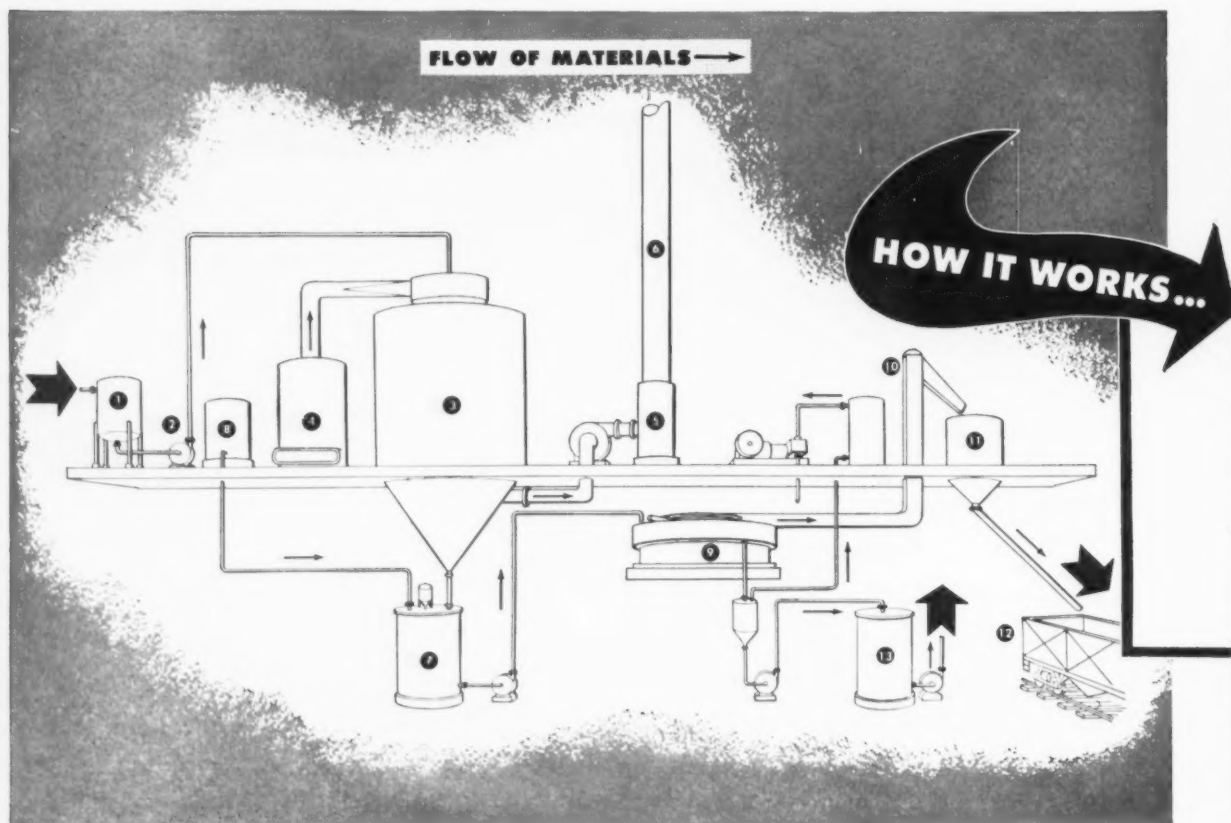


If you operate a CUT ACID REQUIREMENTS

New continuous process, available from Koppers,
of pickling acid used . . . and eliminates waste

FOR OVER A QUARTER OF A CENTURY, wherever a pickling line has been in operation, disposal of spent liquor has been a major headache. But now a new continuous regeneration process—the Koppers Inland-Zahn process—goes a long way toward solving this problem. This system is simple, it is economical, and it has been proved in actual plant-scale commercial operation in Europe.

With this process, the only make-up acid needed is the amount consumed in the pickling reaction plus normal losses. All available free acid in the used liquor is recovered (up to 50% of the original charge). Labor costs are low—just one man can operate the entire regeneration plant. As a result of these savings, operating costs are substantially below those of any presently available disposal method.



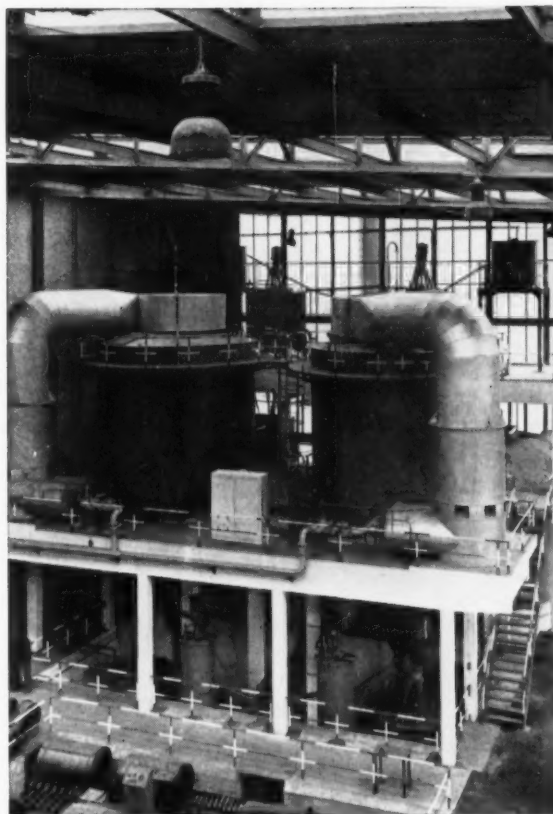
pickling line **IN HALF!**

regenerates up to half
liquor disposal problem

PROVED COMMERCIALY—This process, developed by Inland Steel Company and adapted commercially by Zahn & Co. of West Germany, is now being used successfully in three European steel plants. The benefits achieved include *extremely low maintenance . . .* and more uniform and *higher acid concentrations* in the baths. The latter advantage permits faster steel processing.

NEUTRALIZING PLANTS — The new regeneration process is especially applicable to plants handling 10,000 gallons of effluent, or more, a day. The Chemical Department of Koppers Engineering and Construction Division also designs and builds lime neutralization systems for both large and small pickling operations. Send the coupon for complete information about these and other Koppers Chemical Engineering Services.

Spent pickle liquor (1) is pumped (2) to spray head in an evaporating chamber (3). Here, hot air and flue gases from a combustion chamber (4) concentrate the liquor and cause the ferrous sulfate monohydrate to crystallize out of solution. Vapor laden air is discharged to atmosphere through a mist eliminator and stack (5 and 6). The slurry is dropped into a crystallizing tank (7) where fresh sulfuric acid is added from a metering tank (8). This causes more monohydrate to drop out. The slurry is then separated in a vacuum filter (9) and washed. Salt is conveyed to bins or hopper cars for sale or disposal (10, 11, 12). Mother liquor, containing about 35% acid and 1-2% iron, is pumped to a holding tank (13), ready for dilution and return to the pickling tanks. No reheating is required.



HEART OF THE SYSTEM—This spray dryer concentrates spent liquor to slurry of ferrous sulfate monohydrate crystals suspended in acid. The plant shown here, in Germany, has operated since June, 1954, processing 48,000 gallons per day of waste liquor.

GET ALL THE FACTS!

Koppers Company, Inc.
Engineering and Construction Division
1452 Koppers Building
Pittsburgh 19, Pennsylvania

I would like to receive literature on this new pickle liquor regeneration process . . . and also on Koppers other chemical engineering services. Please send the following:

- ☐ Regeneration of steel pickling solutions by Koppers Inland-Zahn process.
- ☐ Lime neutralization of spent pickle liquor by Koppers.
- ☐ "3 Keys to Selecting Your Industrial Contractor," a brochure describing the variety of Koppers construction services and giving reasons why Koppers should build your next chemical plant.

Name _____

Title _____

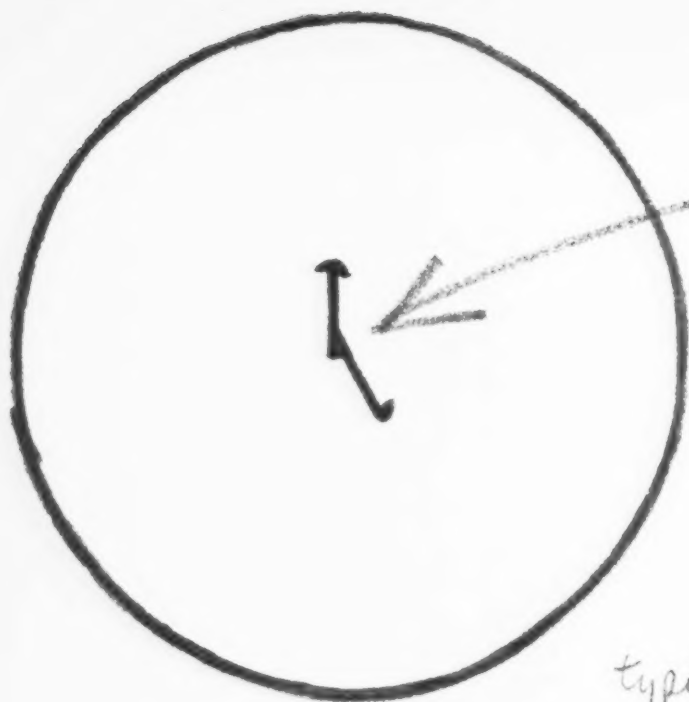
Firm _____

Address _____

City _____ State _____



KOPPERS
CHEMICAL ENGINEERING SERVICES



In use, pressure is concentrated on center section of die

typical extrusion die

MEL-TROL

Until now, it's never been possible to look at an alloy bar or disc and be sure its center is as sound as its surface. Sometimes centerline weakness won't show even in a cross section. But it will show in rejects, breakage, rapid wear. The extrusion die illustrated is just one example.

High alloy or high carbon steel bars and discs made by conventional steelmaking practice are subject to poor toughness and erratic properties at the core. The cause is inhomogeneity—segregation, porosity, weakness—that occurs in the ingot while it is freezing.

Composition of the steel, purity, pouring temperature and ingot mold design all affect core quality. Core defects cannot be entirely eliminated by rolling and processing of mill shapes. They remain in the core of the

bar, and may vary from major defects such as internal cracks, porosity and center segregation to subtle differences in mechanical properties and service behavior between core and surface material which are virtually undetectable before machining or before a part fails in service.

The Mel-Trol process eliminates the problems of inhomogeneity by eliminating their causes.

Mel-Trol is an organized system of extra time, extra care, extra effort—perfecting the steelmaking process to its very greatest efficiency.

Quality control begins with scrap analysis, follows through the melt, casting the ingot, through rolling, annealing—all the mill processes that prepare Carpenter alloys for you—the user. Mel-Trol uses exclusive,

If bar from which die is made has any center porosity, segregation or weakness, die may break, because pressure is centered where these faults concentrate. That is why Mel-Trol alloys are proving superior to regular steels for this highly demanding application. Mel-Trol alloys are uniformly strong at core. Strength is always where it's needed because the Mel-Trol process virtually eliminates possibility of centerline weakness.



enlarged side view section

... new metallurgical achievement that is producing uniformity never before available in specialty steels

Carpenter-developed quality control tools and procedures along with the most modern equipment commercially available.

Mel-Trol gets results because—every quality control tool and procedure used is used to its fullest capability—nothing less. A typical example: Fuel injection nozzles which are exhaustively tested after machining. When

the manufacturer switched to a Mel-Trol alloy, rejects dropped from an average of about 7 per 1,000 to only 2 in 90,000.

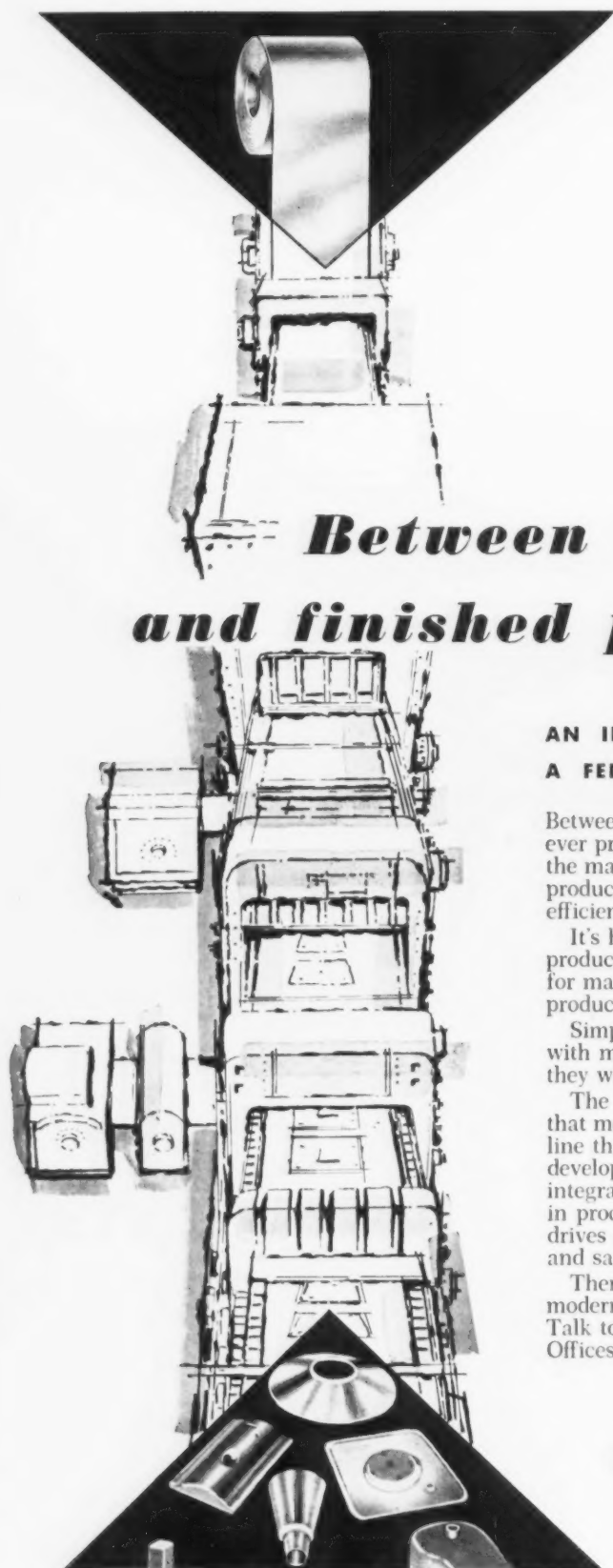
Ask the Carpenter representative who calls on you about Mel-Trol. A selection of superior tool and die steels and elevated temperature alloys produced by the Mel-Trol method is available now—from Carpenter.

Carpenter



The Carpenter Steel Company, 121 W. Bern St., Reading, Pa.
Export Dept.: The Carpenter Steel Co., Port Washington, N. Y.—"CARSTEEL CO."

Pioneering in improved specialty steels through continuing research



***Between material
and finished part...***

AN IDEA THAT MAKES SENSE —

A FEDERAL-WARCO PRODUCTION LINE

Between material and finished part is the ever present problem of bringing together the machinery necessary to perform all production operations as speedily and efficiently as possible.

It's here, the Federal-Warco, this packaged production line has proved to be the answer for many of the nation's foremost production experts.

Simply provide Federal-Warco engineers with material and part information and they will develop a line to do the job.

The advantages: One source responsibility that means faster, more thorough service; a line that is 100% harmonic, all stations developed especially to work in synchronization; integrated and automated handling of work in process; the possibility of utilizing common drives and bases, reducing operating costs and saving valuable floor space.

There is much more. Why not look into this modern method of production line manufacture? Talk to your Federal-Warco representative. Offices in all leading industrial areas.

Federal / Warco
PACKAGED
PRODUCTION LINES



**Roebling
Tire Bead Wire:
Packaged for
Maximum Benefit**

The problems eliminated by this unique reel-less core packaging system are manifold. Loads are palletized two cores per pallet and may be stacked two or three high. This, plus the fact that

you need not accumulate empty reels means storage space requirements are cut to *less than half*. You do away with all freight and handling costs on reels, the bother and expense of "bookkeeping" returnable reels, and the freezing of money in reel deposits.

This is typical of Roebling's advanced packaging methods—that makes handling Roebling high-quality wire so

much easier. For details on this efficient Roebling Tire Bead Wire packaging method, or information on other types of Roebling wire, write Wire and Cold Rolled Steel Products Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

ROEBLING

Branch Offices in Principal Cities
Subsidiary of The Colorado Fuel and Iron Corporation





for Sand...

For all the kinds of bulk materials you want to move, this "PAYLOADER" Model HA is probably big enough. It scoops up, transports and dumps up to a ton at a time. It carries its loads indoors or outdoors at speeds up to 10 miles per hour. It unloads boxcars of sand or fire clay, delivers its loads over bin or hopper edges up to 6½ feet high. It travels through doorways only 4½ feet wide — can handle more pounds per load and more loads per hour than bigger, heavier tractor-shovels.

The model HA features the famous Hough bucket action with 40 degree tip back at ground level giving low, close load-carry position for maximum capacity and stability.

If you do need a larger tractor-shovel than the model HA, there are five bigger "PAYLOADER" models from which to choose up to 9,000-pound load-carrying capacity. The Frank G. Hough Co., 733 Sunnyside Ave., Libertyville, Ill.

for Coke...



PAYLOADER

THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.



11A-5a



for Scrap...

This basic model HA "PAYLOADER" is more than an efficient bulk-materials handling unit — it is also a floor sweeper, a load grapple, a pushing tractor, a snow plow, a fork lift . . . in fact, the most versatile and useful tractor-shovel any plant can own.

This multi-purpose usefulness is made possible by the many quickly-mounted attachments that are available to adapt this "PAYLOADER" to these many special tasks. Some of these attachments such as the pick-up floor sweeper, the load grapple and the "PAYHOPPER" are available only for "PAYLOADER" tractor-shovels.

Your nearby Hough Distributor, who sells and services "PAYLOADER" units is ready to demonstrate the profitable model HA. In the "Hough Purchase and Lease Plans" he also has a wide choice of financing arrangements to offer you. The Frank G. Hough Co., 733 Sunnyside Ave., Libertyville, Ill.

for Castings...



PAYLOADER

THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.

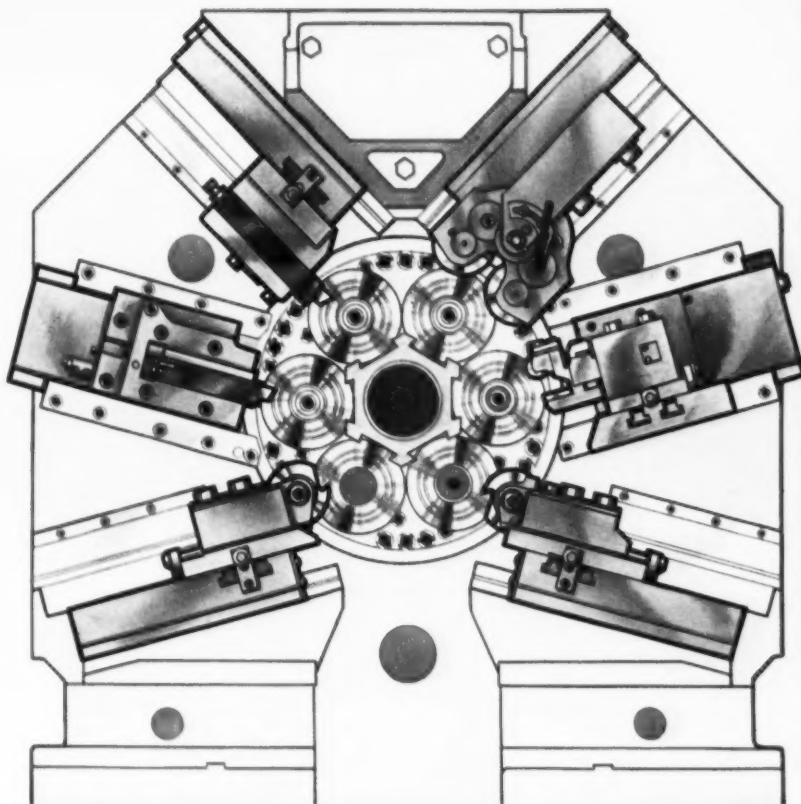


11A-5b

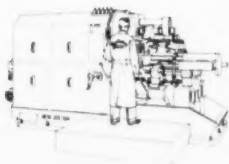
Look at New Britain's
**new cross slide
arrangement**



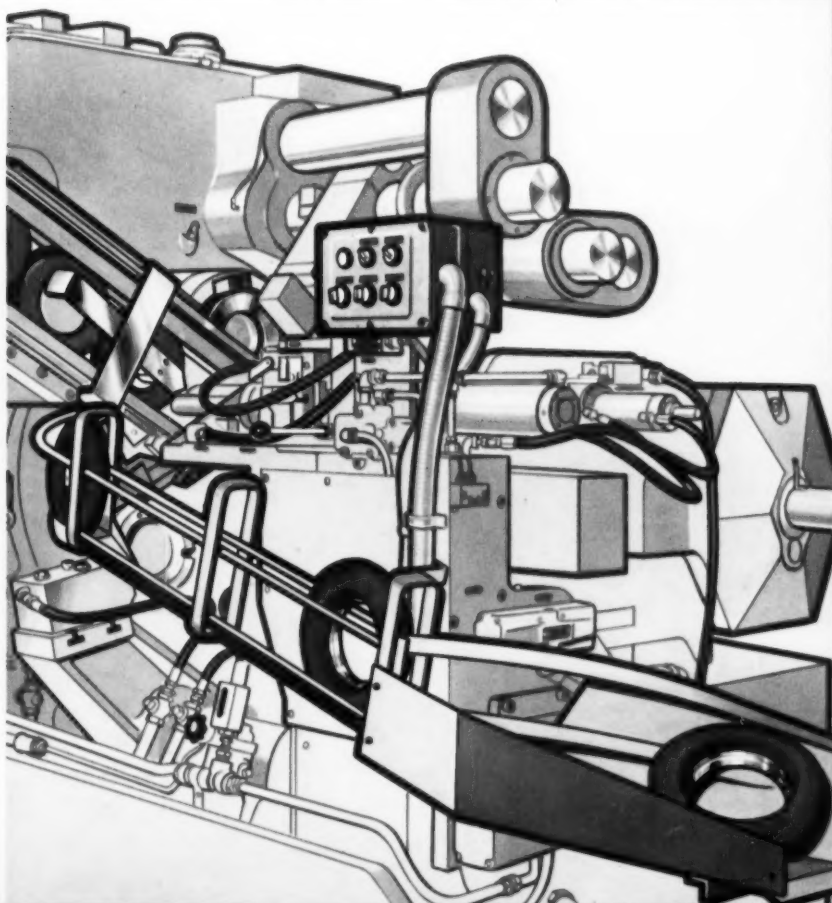
Independent radial cross slides in *all* positions, providing maximum clearance for more cross slide operations.

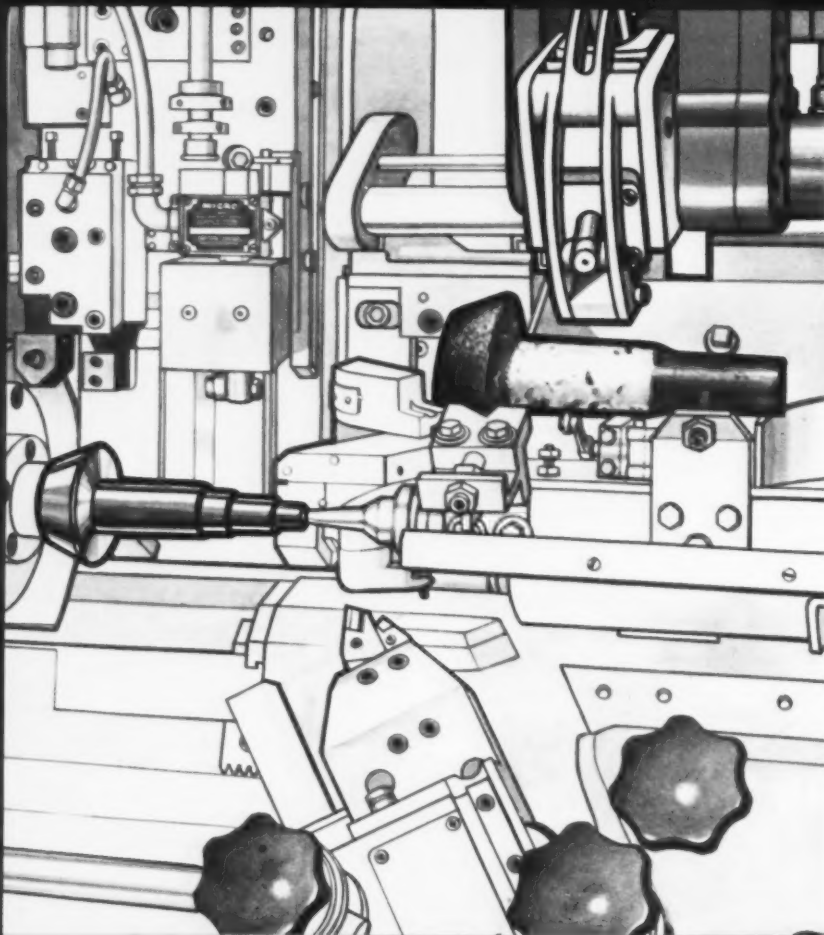


Look at New Britain's
**open-end
chucker design**



Greater accessibility for all applications and particularly well adapted to automatic handling of pieces. New Britain-Gridley Machine Division, The New Britain Machine Company, New Britain, Connecticut.

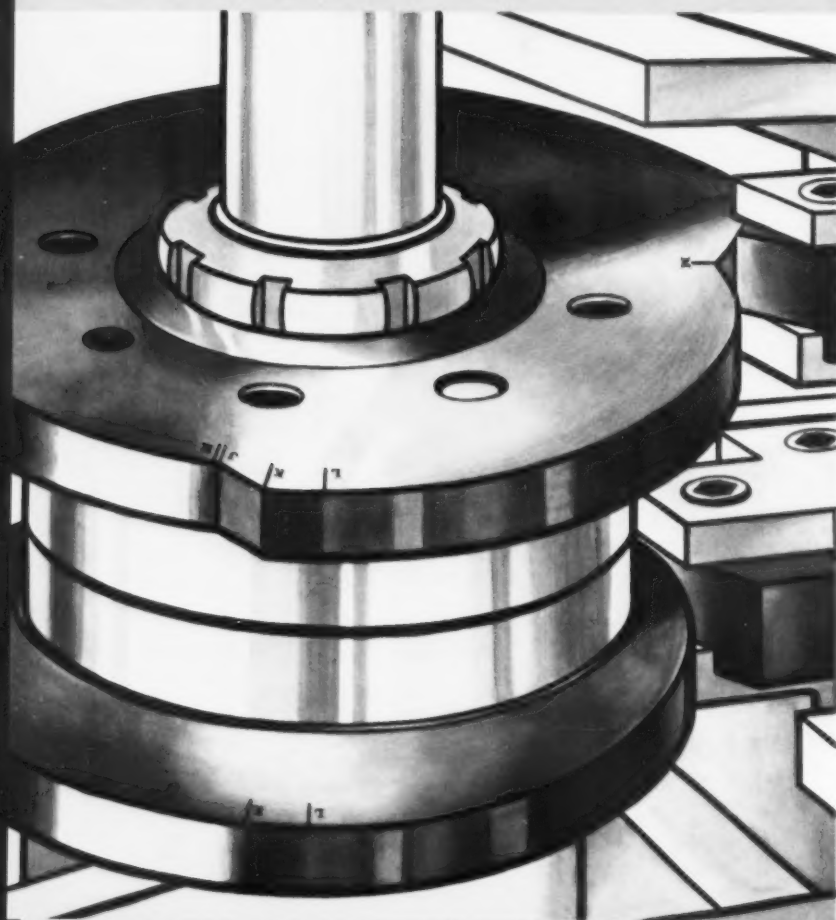




Look at
Automatic Loading on
New Britain +GF+



This basic optional feature can make money for you whether you are working with forgings, bar slugs, or bar stock.



Look at New Britain's
cam-controlled
boring machine



When you are working to tenths there is no substitute for the positive tool control that only precision cams provide. New Britain-Gridley Machine Division, The New Britain Machine Company, New Britain, Connecticut.

YOLOY "E" IS ON THE JOB

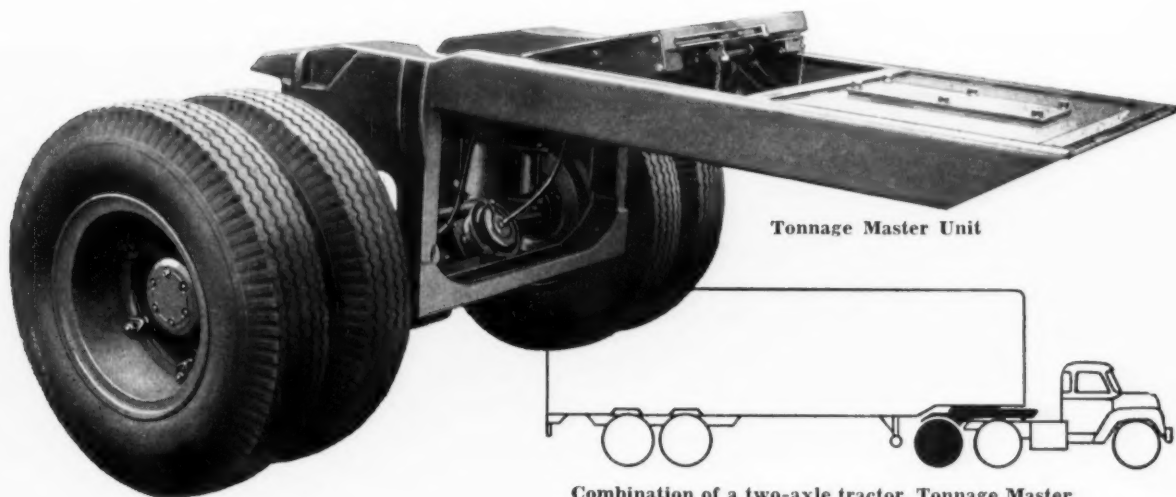
... providing increased strength,
corrosion and impact resistance for
Fruehauf's new "Tonnage Master"

This "extra axle" conversion assembly, built exclusively by Calumet Tonnage Master Fabricators, Inc., for the Fruehauf Trailer Company, enables truck operators to get maximum performance from their existing equipment.

Riding behind a two-axle tractor, a Tonnage Master provides increased load carrying capacity, reduction in tractor wheelbase, improved traction on curves, increased tire life as well as easier riding through utilization of more springs.

All components—except springs and axles—are fabricated from Youngstown's Yoloy "E" high strength-low alloy steel. This versatile steel was wisely specified to provide the units with longer life, increased resistance to shock, vibration and corrosion, as well as lighter—yet stronger—construction.

Youngstown's complete family of Yoloy steels is available in Sheets, Plates, Bars, Shapes, Cold Drawn Bars and Tubular Products. Complete informative Data Sheets on each Yoloy steel will be promptly sent upon request.



Tonnage Master Unit

Combination of a two-axle tractor, Tonnage Master and a dual-axle trailer provides five axles for carrying top loads at greater safety.

Write for these free pamphlets in
The Yoloy Family series:

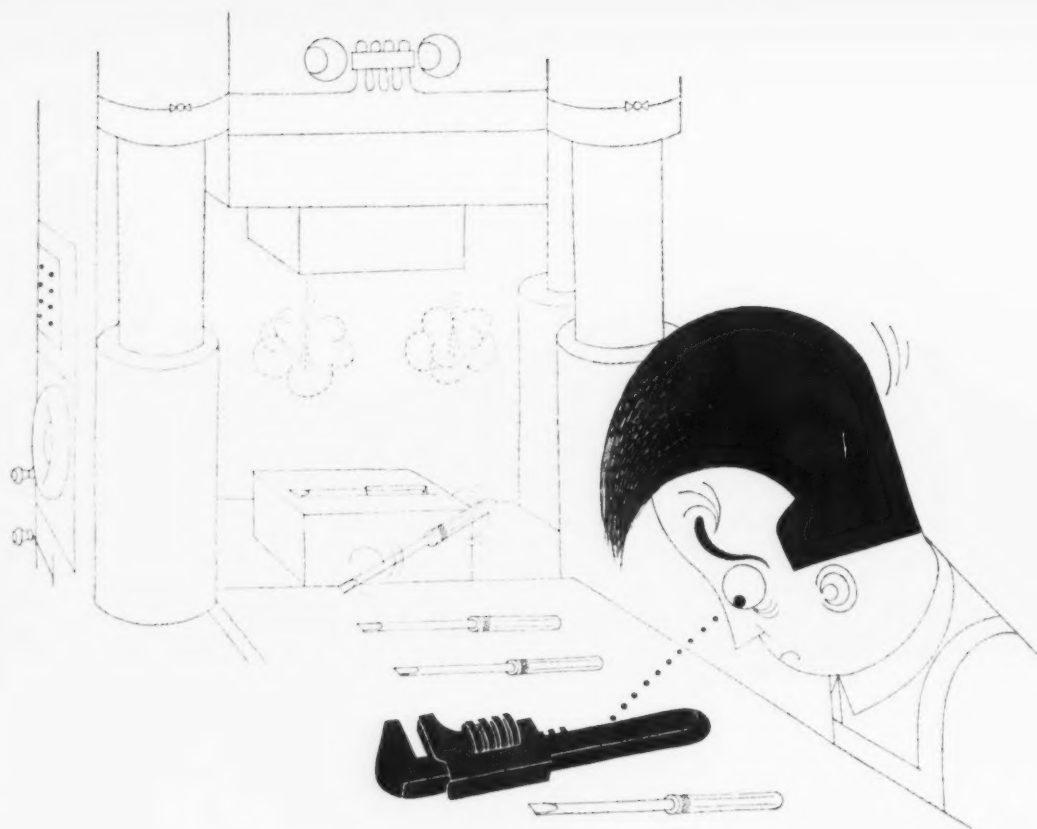
YOLOY "E"	High Strength Low Alloy Steel—standard applications
YOLOY	High Strength Low Alloy Steel—special applications
YOLOY "S"	Higher Strength Steel for increased service life
YOLOY "C"	Corrosion Resistant Grade for deep forming
YOLOY PIPE	Continuous Weld for corrosion resistant applications



THE YOUNGSTOWN SHEET AND TUBE COMPANY

Manufacturers of Carbon, Alloy and Yoloy Steel

General Offices - Youngstown 1, Ohio
District Sales Offices in Principal Cities



Got a hot work problem?

Crucible **CHRO-MOW** hot work tool steel may be the solution. It's tough, resists wear at elevated temperatures—and you can get it quickly from local Crucible warehouses.

CHRO-MOW is an air hardening tool steel with a very desirable combination of toughness, red hardness and resistance to heat checking. That's why it's an excellent choice for hot forging dies, extrusion dies, or mandrels.

But Chro-Mow is only one of dozens of special tool steels regularly stocked at Crucible warehouses. There is a grade for each of your needs.

And, at Crucible, experienced engineers are ready with advice on selection or fabrication, when you want it. For Crucible is the only specialty steel producer *fully integrated to the point of use*. That means control and responsibility from raw material to warehouse delivery to you.

STOCKS MAINTAINED OF:

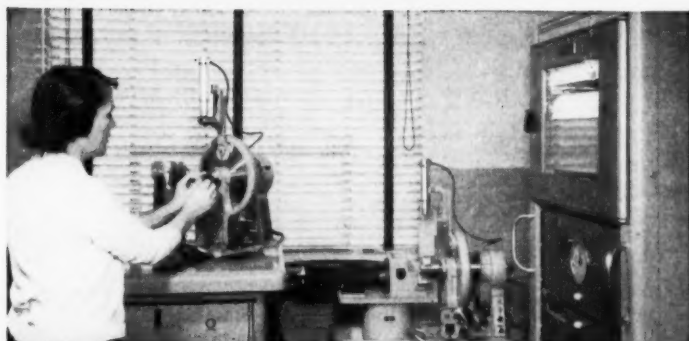
Rex High Speed Steel . . .
ALL grades of Tool Steel
(including Die Casting Die
and Plastic Mold Steel,
Drill Rod, Tool Bits, and
Hollow Tool Steel Bars)
. . . Stainless Steel (Sheets,
Bars, Wire, Billets, Elec-
trodes) . . . Max-el, Hy-Tuf,
AISI Alloy . . . Onyx Spring,
Hollow Drill Steel and
other special purpose steels.

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WAREHOUSE SERVICE

Crucible Steel Company of America

General Sales Offices, The Oliver Building, Mellon Square, Pittsburgh 22, Pa. Branch Offices and Warehouses: Atlanta • Baltimore
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Harrison • Houston • Indianapolis • Los Angeles • Milwaukee • New Haven • New York • Philadelphia • Pittsburgh • Portland, Ore.
Providence • Rockford • San Francisco • Seattle • Springfield, Mass. • St. Louis • St. Paul • Syracuse • Toronto, Ont.



IN QUALITY

This X-ray spectrograph makes a complex analysis of our alloy steel... does it faster and for more accurately than previous methods.

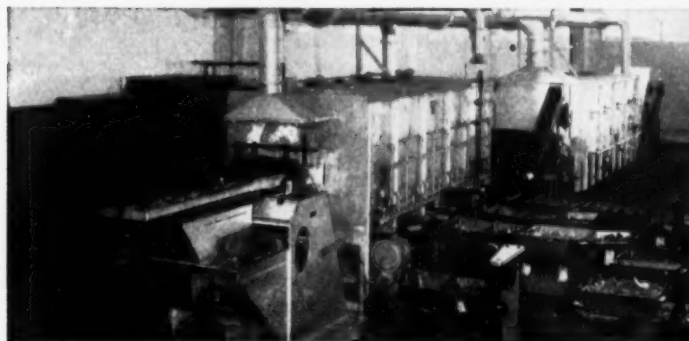
Holo-Krome socket screws



IN PRECISION

New and revolutionary Holo-Krome forging methods give added strength and improved appearance to socket screws.

when your products demand the best!



IN KNOW-HOW

In this showpiece of industry, the most modern hardening furnaces. Not readily seen but equally present—years of skill and experience as socket screw specialists.

**LOOK TO HOLO-KROME
FOR THE FINEST IN SOCKET SCREWS...
FOR UNMATCHED SAME-DAY SERVICE!**



**HOLO-KROME
SOCKET SCREWS**

SOLD ONLY THROUGH AUTHORIZED HOLO-KROME DISTRIBUTORS



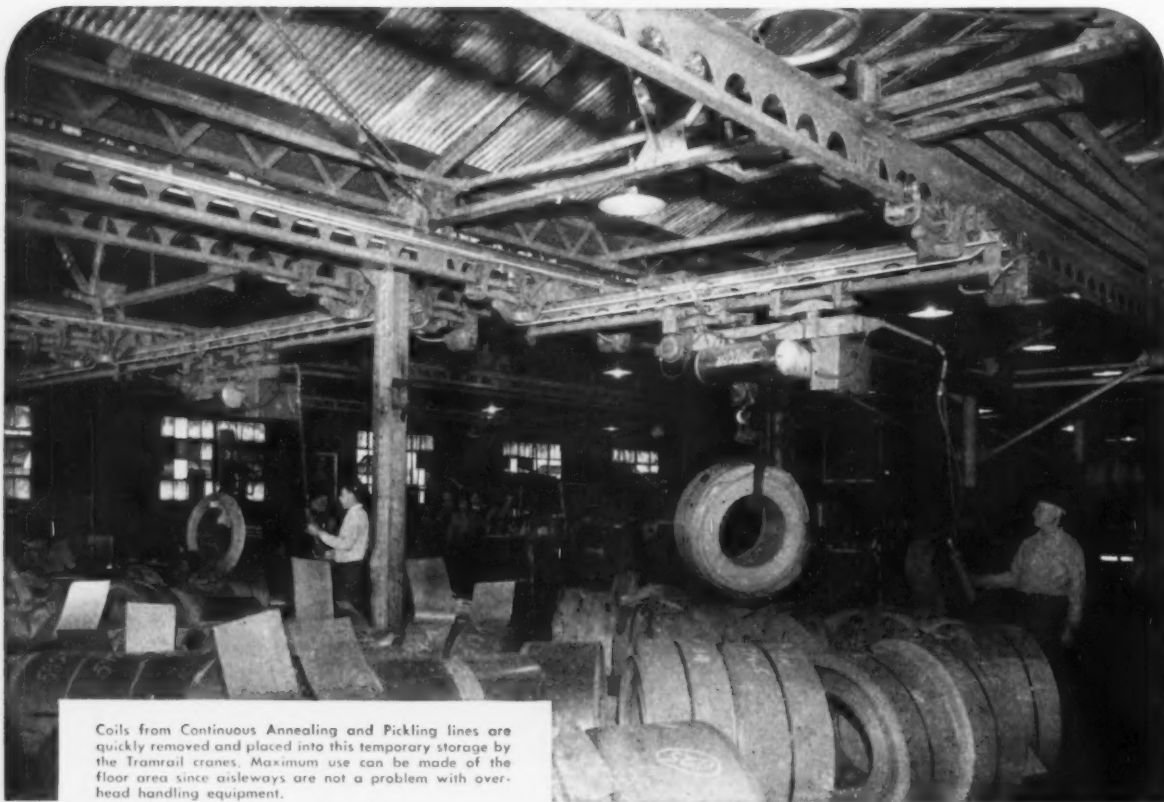
THE HOLO-KROME SCREW CORP • HARTFORD 10, CONN., U. S. A.

THE IRON AGE, November 7, 1957



Tramrail Cranes **BOOST** Strip Production

Speed Handling—Cut "Down Time"—Aid Safety



Coils from Continuous Annealing and Pickling lines are quickly removed and placed into this temporary storage by the Tramrail cranes. Maximum use can be made of the floor area since aiseways are not a problem with overhead handling equipment.

AS a leading producer of high quality alloy strip steels, mostly of light gauge, the Superior Steel Corp., Carnegie, Pa. has secured definite production advantages and greatly improved overall plant efficiency through abundant use of Cleveland Tramrail cranes.

As the work is primarily that of rolling, annealing, pickling and handling, to obtain maximum production from their equipment, it is necessary to keep it in operation as many minutes out of the day as possible. This means that there be no

delays in handling the coils of strip to and from the mills. It also means that the mill rolls must be changed in the least possible time. The Tramrail cranes have proven of great success in fulfilling these requirements and reducing "down time" to a minimum.

They have also proven to be a great aid to the workers' welfare. Being fully motorized, they have practically eliminated all manual lifting and moving. As a result, worker fatigue has been reduced and safety improved.



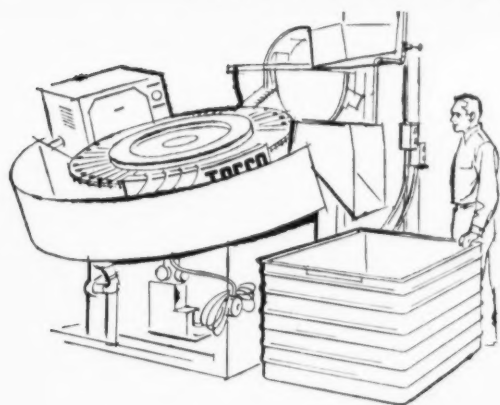
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THE CLEVELAND CRANE & ENGINEERING CO.
4883 EAST 284TH ST., WICKLIFFE, OHIO

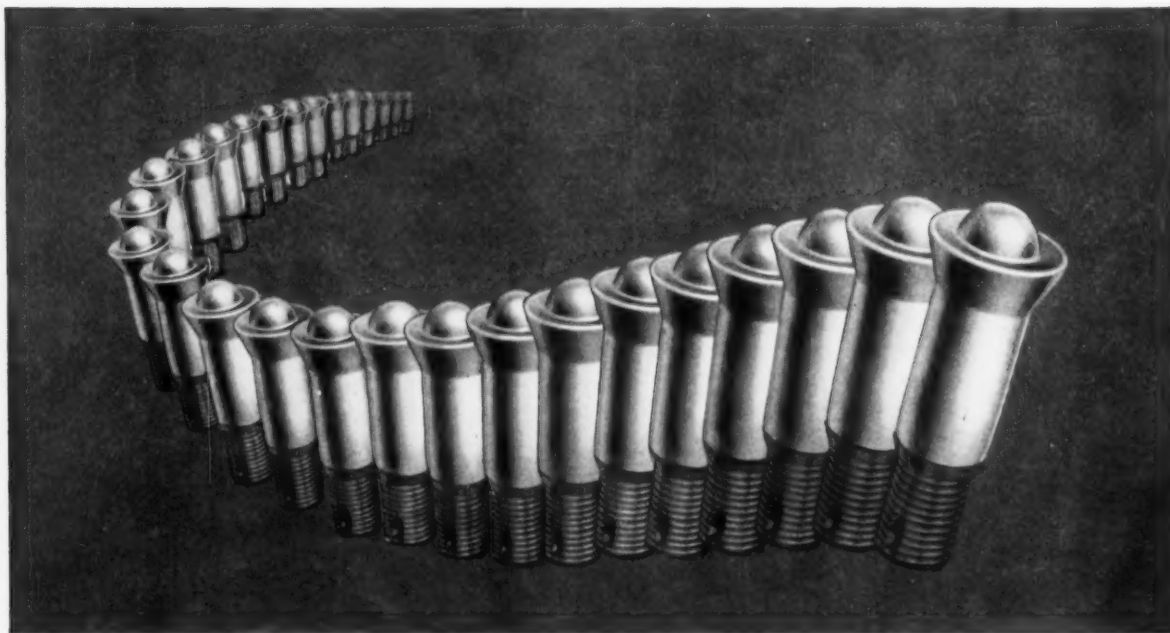
CLEVELAND  TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

THOMPSON PRODUCTS ANNEALS THREADS ON BALL STUDS



ONE A SECOND!

with TOCCO Induction Heating*



Up Goes Production—When progressive engineers at Thompson's Michigan Division switched from conventional gas annealing to fully automatic TOCCO for annealing threads on automotive ball studs, production jumped from 2128 to 3226 parts per hour—an increase of over 50%.

Localized TOCCO heating draws threads from 60 to 30 Rockwell C, using 50 kw at a frequency of 10,000 cycles per second.

Down Go Costs—While production zoomed, costs dropped sharply with TOCCO annealing—a reduction of 34% in direct labor costs alone. With an average monthly output of 350,000 of these parts, Thompson saves thousands of dollars per year with TOCCO. If you heat metal parts for annealing, forging, brazing or hardening, investigate how TOCCO can up your production and lower your costs.



TOCCO

THE OHIO CRANKSHAFT COMPANY

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The Ohio Crankshaft Co. • Dept. A-11, Cleveland 5, Ohio

Please send copy of "Typical Results of TOCCO Induction Hardening, Heat-Treating and Annealing".

Name

Position

Company

Address

City Zone State

For whatever you make . . .

N-A-X[®] HIGH-STRENGTH STEELS

CONTRIBUTE STRENGTH

WITH LIGHT WEIGHT



N-A-X Alloy Division, Dept. A-10

GREAT LAKES STEEL CORPORATION

Detroit 29, Michigan • Division of

NATIONAL STEEL CORPORATION

N-A-X Alloy Div., Dept. A-10
Great Lakes Steel Corp., Detroit 29, Mich.

- ☐ Please send me 8-page illustrated technical catalog on
N-A-X HIGH-STRENGTH steels.
- ☐ Please have your representative contact me.

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Company _____

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Hamlintainers—the versatile knock-down, pallet-type steel shop and shipping boxes built by Hamlin Metal Products Corp., Akron, Ohio—make still another profitable example of the adaptability of N-A-X HIGH-STRENGTH steels.

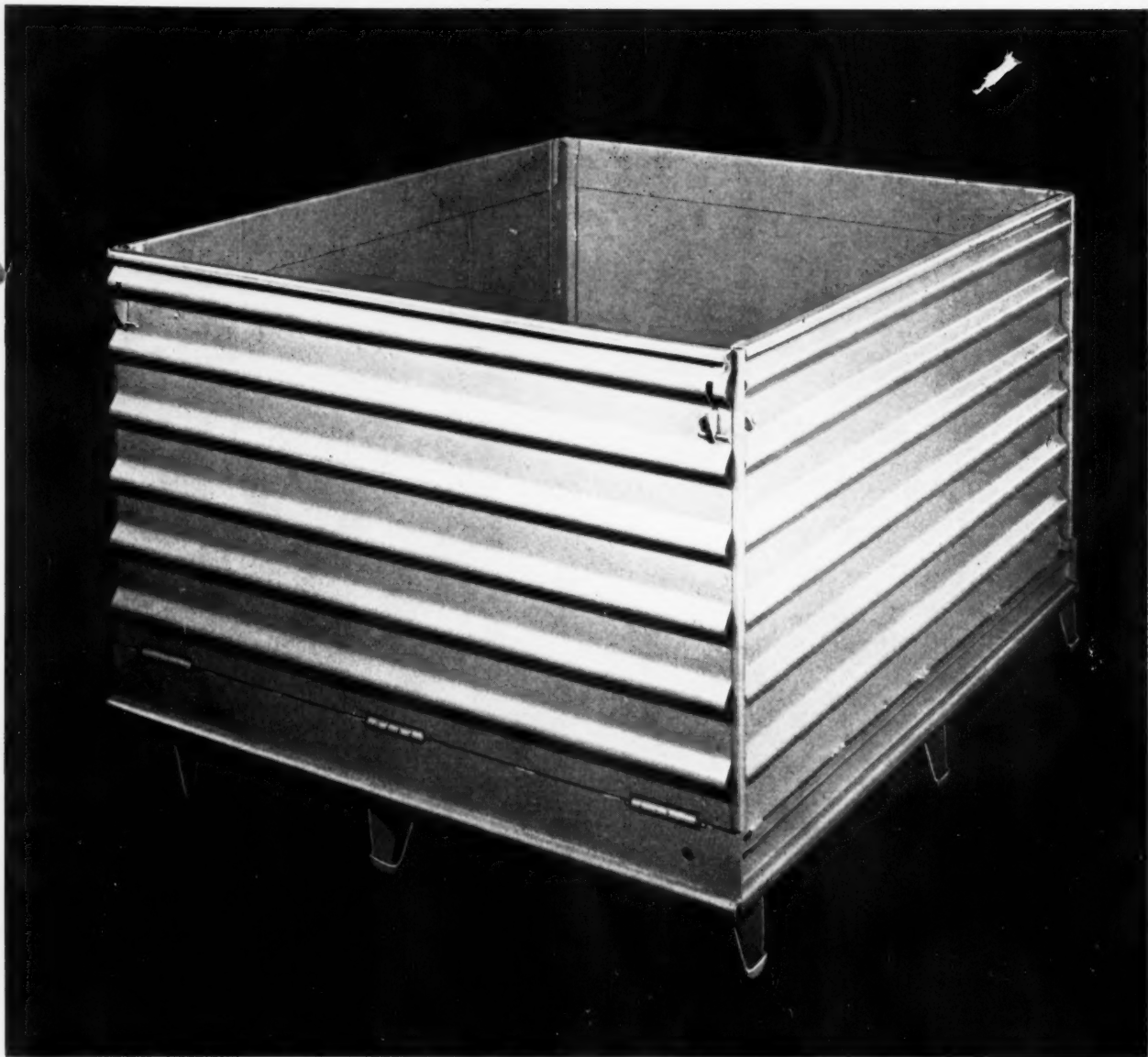
Developed in answer to Hamlin's own shop problems, *Hamlintainers* quickly proved themselves in the nation's leading automobile, aircraft and appliance manufacturing plants. On the job *Hamlintainers* must have strength to carry heavy fabricated parts and still be light enough for fast, easy plant handling and minimum return freight costs.

Like so many producers, Hamlin looked for and found these characteristics of strength with lightness in N-A-X HIGH-STRENGTH steels, along with other significant benefits.

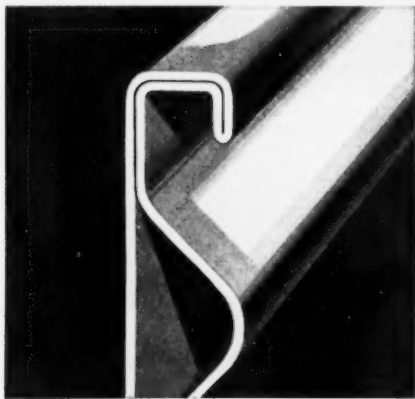
Check These Important Advantages for Your Job: N-A-X HIGH-STRENGTH steels—both N-A-X HIGH-TENSILE and N-A-X FINEGRAIN—compared with carbon steel, are 50% stronger . . . have high fatigue life with great toughness . . . are cold formed readily into difficult stampings . . . are stable against aging . . . have greater resistance to abrasion . . . are readily welded by any process . . . offer greater paint adhesion . . . polish to a high luster at minimum cost.

Although N-A-X FINEGRAIN's resistance to normal atmospheric corrosion is twice that of carbon steel, N-A-X HIGH-TENSILE is recommended where resistance to extreme atmospheric corrosion is important.

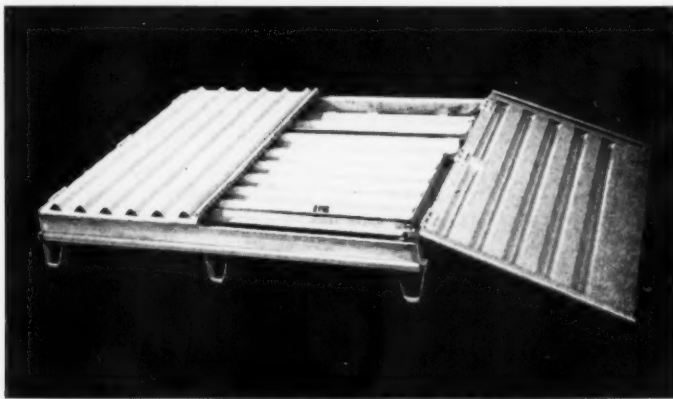
For whatever you make, from steel boxes to boxcars, with N-A-X HIGH-STRENGTH steels you can design longer life, and or less weight and economy into your products. Let us show you how.



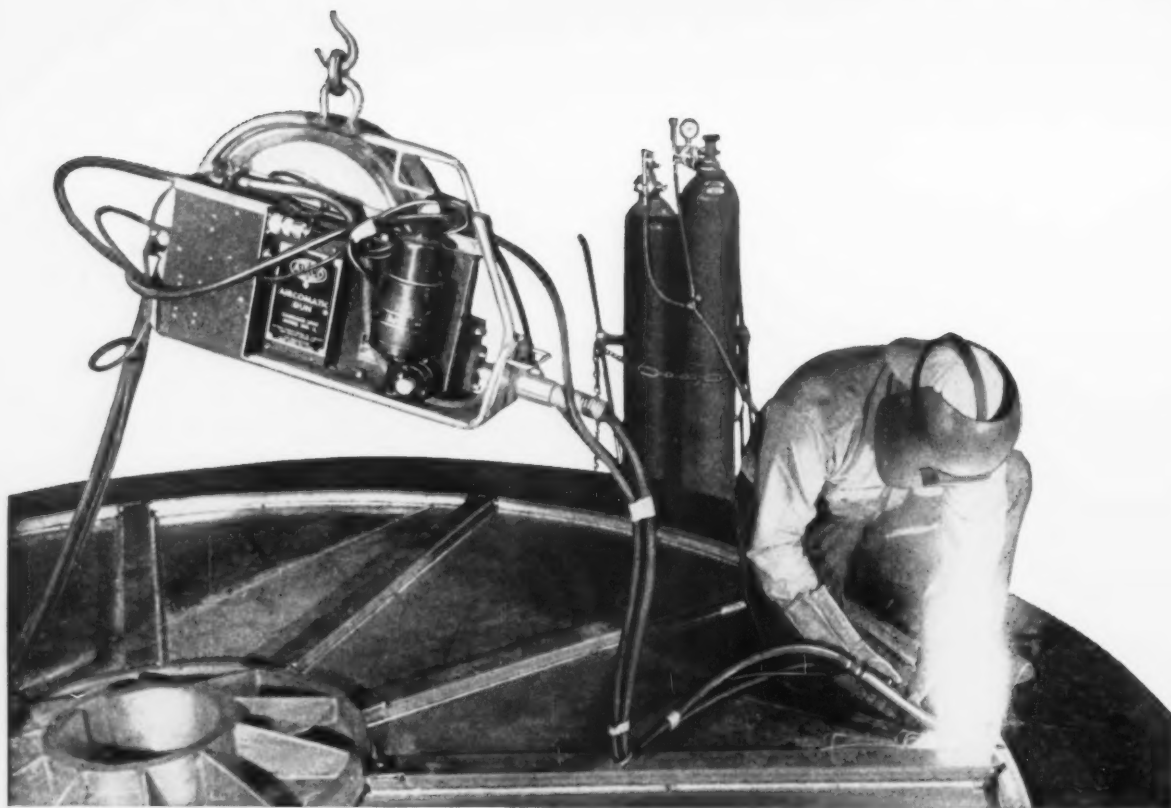
Hamlintainers are the result of more than five years of intensive research, development and practical on-the-job testing. Thanks to N-A-X HIGH-STRENGTH steels, Hamlintainers are tight enough to hold rivets, strong enough to carry forgings and light enough for moving by any standard plant fork-lift truck.



The great formability of N-A-X HIGH-STRENGTH steels makes this design easy to produce. Rounded edges add strength, safety.



In less than 20 seconds, one worker can set up a Hamlinter, or fold it flat for easy stacking when not in use. This important benefit continues to win new friends for Hamlintainers with manufacturers.



a complete **AIRCOMATIC**® "package"...from recommendation to results



and control equipment, cables, hoses, and flexible wire casing.

Aircomatic welding is an inert-gas, shielded arc process using a consumable wire electrode. The basic unit, manual or automatic, designed and manufactured by Airco, includes the welding head, carriage assembly for wire drive



The consumable wire electrode is produced to rigid Airco specifications as to purity, cast, and metallurgical content. Normally supplied on expendable spools, Aircomatic wire is available in aluminum, steel, stainless steel, nickel, titanium, copper, and copper base alloys.



Airco shielding gases include both helium and argon, produced by Airco, or mixtures thereof for particular requirements. Pure carbon dioxide gas is also available from Airco for use as a shielding medium where applicable.



Aircomatic is a direct-current welding process. A complete line of Airco motor-generator and rectifier type welders are designed for Aircomatic characteristics—the latest of which is a new 800 amp ACV welder.

The Aircomatic process was invented, designed, developed, and licensed by Airco. Airco's nine years of experience have given the metal working industry an inert-gas process that welds all kinds of metals—adding speed, economy and versatility to every suitable application.

An Airco Representative can give you a completely

unbiased opinion as to how Aircomatic can best be employed—because—Airco is a leading manufacturer-supplier of all types of oxyacetylene, metallic arc and inert-gas shielded welding and flame cutting processes, their controls, supplies, and accessories.

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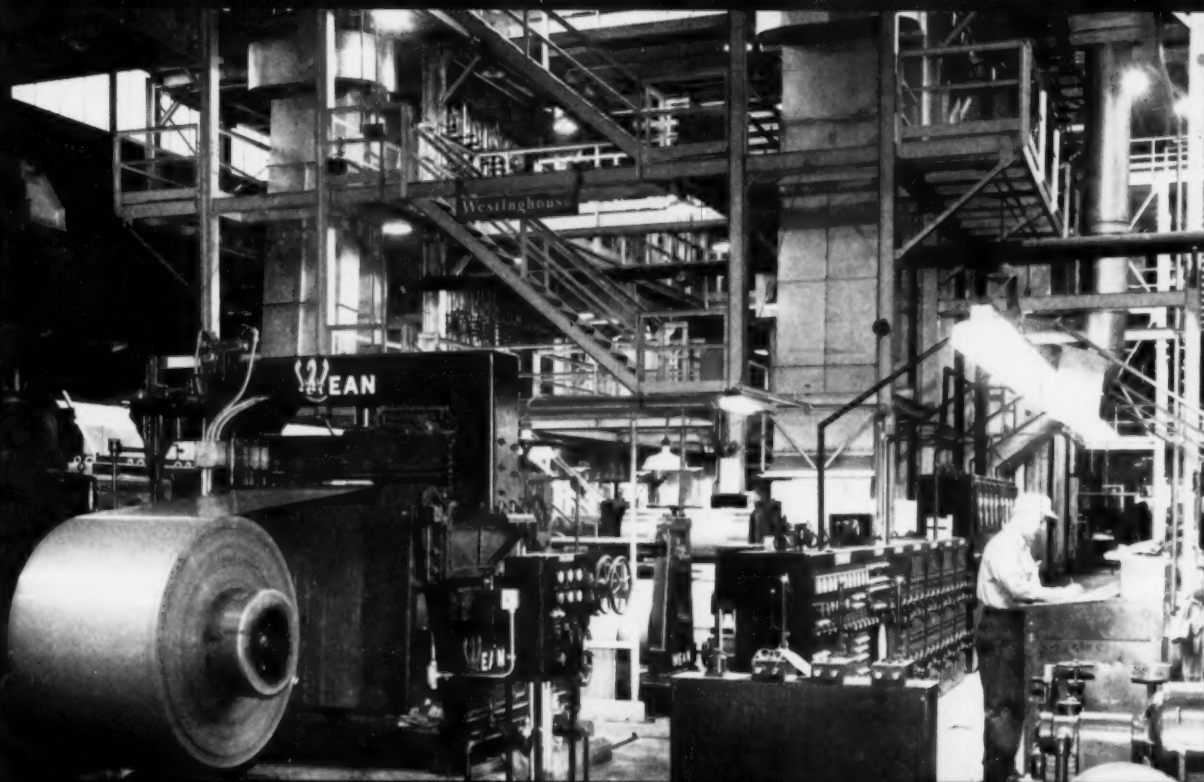
On the west coast —
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Cuban Air Products Corporation
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Products of the divisions of Air Reduction Company, Incorporated, include: **AIRCO** — industrial gases, welding and cutting equipment, and acetylenic chemicals • **PURECO** — carbon dioxide — gaseous, liquid, solid ("DRY-ICE") • **OHIO** — medical gases and hospital equipment • **NATIONAL CARBIDE** — pipeline acetylene and calcium carbide • **COLTON** — polyvinyl acetate, alcohols, and other synthetic resins.

Continuous annealing produces better strip faster through



WEAN CREATIVE ENGINEERING

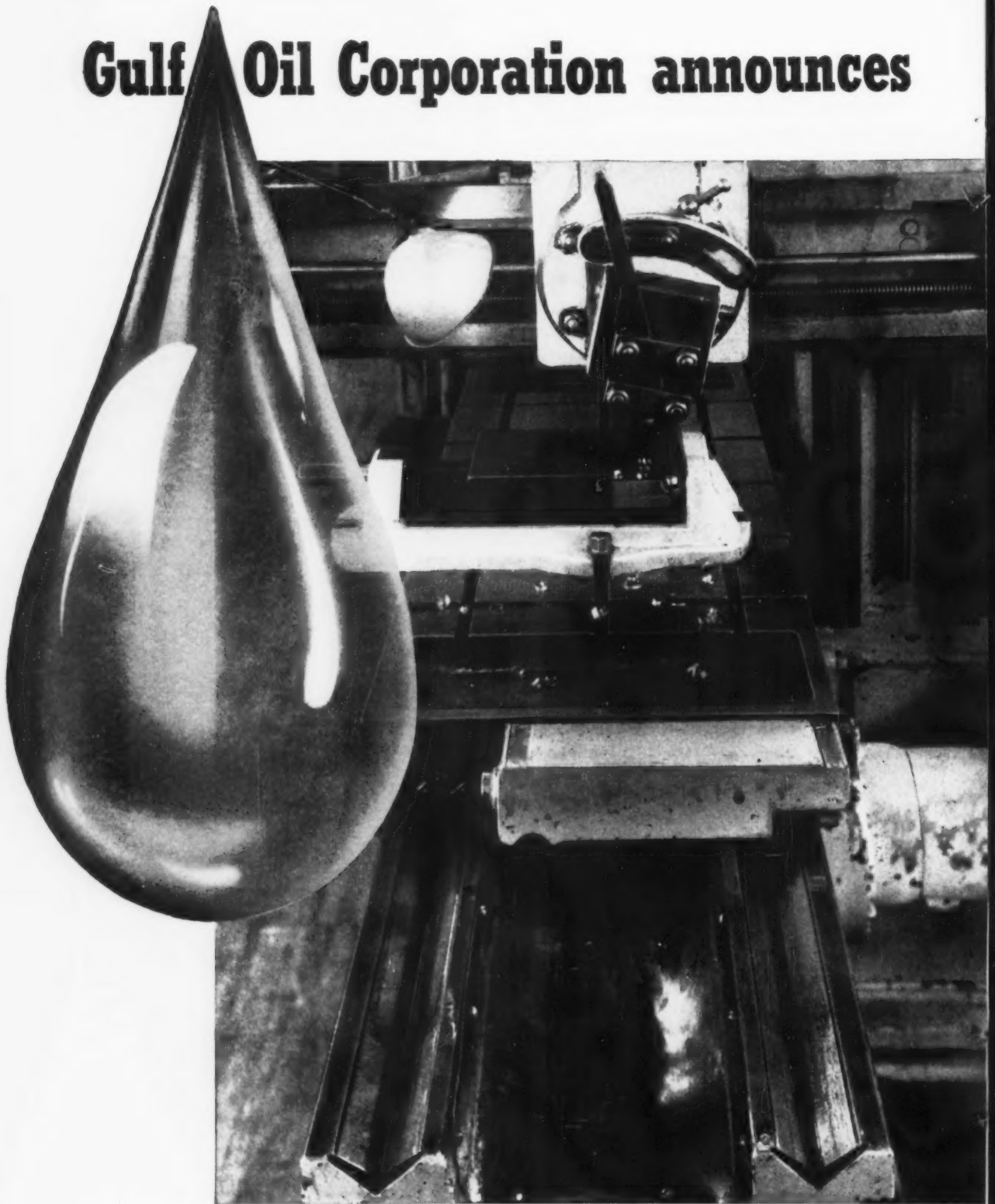


Moving at hundreds of feet a minute, silicon steel strip is annealed in this WEAN-Engineered continuous annealing line at U. S. Steel's Vandergrift plant. WEAN Creative Engineering provides better operating control and more uniform anneal at maximum speed for this type of operation.

WEAN has designed and built nine silicon and tinplate lines—eleven stainless steel lines... more than all other firms combined. Why not call on this vast experience in Creative Engineering to solve your annealing problems.

THE WEAN ENGINEERING COMPANY INC., WARREN, OHIO

Gulf Oil Corporation announces



Gulfway meets machine tool manufacturers' specifications as a way lubricant and hydraulic medium for grinders, milling machines, planers and boring machines, lathes and other machine tools.

GULFWAY

new three-purpose oil for smoother operation of machine tools

AS A WAY LUBRICANT



Gulfway forms an exceptionally slippery and tenacious film on slides and ways. Its inherent high oiliness is bolstered by a tackiness agent that keeps it sticking to metal. Gulfway will not squeeze out when the table is at rest for long periods. It contains a special low-shear additive that maintains lubricity when clearances are tight or loads are excessive. Gulfway eliminates "stick-slip" chattering that shortens tool life and causes excessive wear of the ways.

AS A HYDRAULIC FLUID



Gulfway will not plug hydraulic lines and controls, or cause pumps to work erratically. It flows freely at all times, even after long periods of dormancy—needs no run-in or warm up and places no strain on pump or motor.

AS A BEARING AND GEAR OIL



Gulfway's characteristic oiliness and high load-bearing capacity make it an ideal lubricant for machine tool gears and bearings. Its long service stability provides an extra margin of economy.

Gulfway is available in two different viscosities. Why not make this new oil prove itself in one or more of *your* machines? Contact your nearest Gulf office, or write to:



GULF OIL CORPORATION

Department DM, Gulf Building
Pittsburgh 30, Pennsylvania

THE FINEST PETROLEUM PRODUCTS FOR ALL YOUR NEEDS



**Look what you
can do with it!**



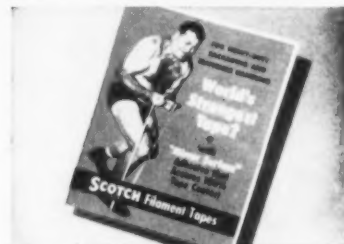
HARD-TO-HANDLE materials, such as paper sheets in bulk, can be easily packaged using "Scotch" Brand Filament Tape. Super-strong tape both seals and reinforces covering.



LARGE cartons and expendable pallets are easily closed and reinforced with "Scotch" Filament Tape. Tape won't cut workmen's hands; won't harm contents; is easily disposed of.



MAKE your own containers for odd-sized or odd-shaped products with fibreboard padding and "Scotch" Filament Tape. "Mirror surface" adhesive sticks at a touch; holds securely.

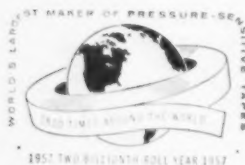


SEND FOR free booklet showing how "Scotch" Brand Filament Tape can help solve your heavy-duty packaging and materials-handling problems. Write on your letterhead to 3M Co., St. Paul 6, Minn., Dept. DE-117.

World's strongest tape?

Even wrestler Bronko Nagurski can't break it! "Scotch" Brand Filament Tape is amazingly strong, super shock-resistant. Thousands of filaments imbedded in the pressure-sensitive adhesive give it up to 500 lbs. tensile strength per inch of width. Four colors: Red, Blue, Black, White and Transparent. Ask your regular tape distributor how you can use it for heavy-duty packaging, or write us direct. Always specify "Scotch" Brand, the *quality* tape . . . and stick with it!

FILAMENT TAPE . . . one of over 300 Pressure-Sensitive Tapes, trademarked . . .

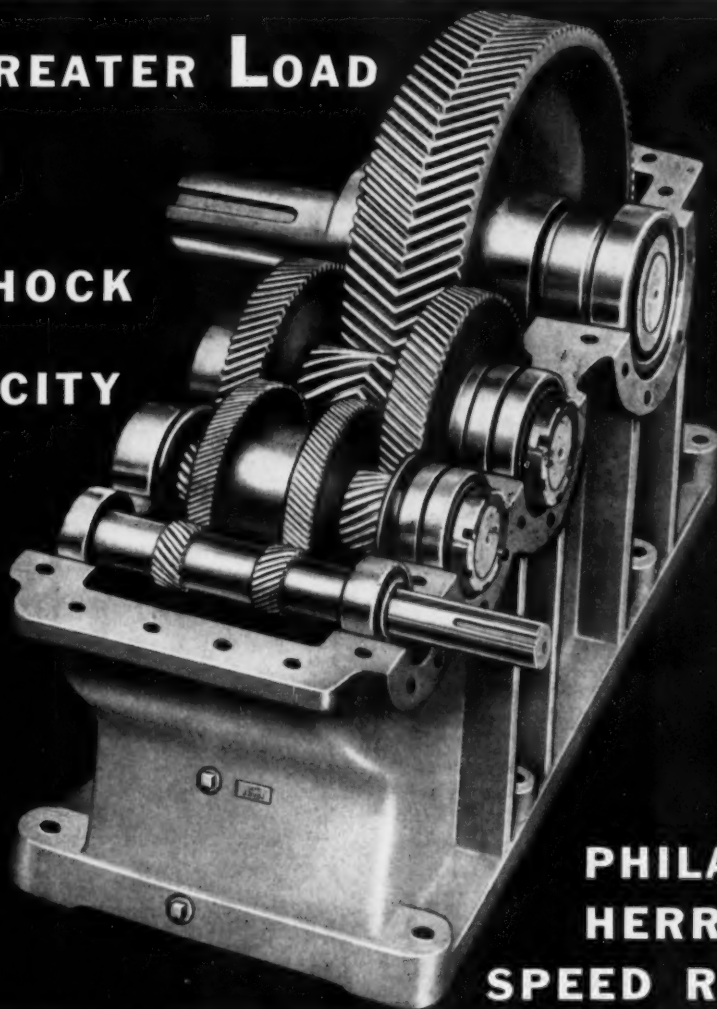


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BRAND

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**PHILADELPHIA
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**...PAY OFF IN HIGH EFFICIENCY
GREATER STRENGTH, LONGER LIFE**



Send for new 48-page catalog . . . contains complete design and application data on these widely used, highly efficient units.

Where you have a machine drive that requires high horsepower speed reduction under grueling load and shock conditions, specify Philadelphia Continuous Tooth Herringbone Speed Reducers . . . Built to withstand the most severe round-the-clock operation, these Reducers offer you extra service dividends through high efficiency, greater strength, and years of quiet, trouble-free operation.

Herringbone and Helical Gear teeth are precision cut for maximum tooth contact and overlap . . . assure uniformity of torque and freedom from damaging vibration.

Gears and Pinions are arranged symmetrically within rugged, compact housings, which assures equal loads on each shaft bearing, and minimizes the most severe stresses. Fully enclosed, self-contained housings prevent oil leakage . . . no parts such as glands require adjustment . . . more than ample oil reservoir assures cool correct lubrication. Available in single, double and triple reductions covering a range of ratios from 1.75:1 up to 292:1, Philadelphia Herringbone Reducers provide optimum performance at minimum cost.

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INDUSTRIAL GEARS & SPEED REDUCERS • LIMITORQUE VALVE CONTROLS • FLUID MIXERS • FLEXIBLE COUPLINGS
Virginia Gear & Machine Corp. • Lynchburg, Va.



Smashing scrap since 1953 . . . this 48" diameter, 16,770-lb. Ni-Hard drop ball is still going strong. Pays maximum return per dollar invested. High hardness helps lengthen its life.

In addition, it is tougher than this hardness indicates. That's why it withstands the shock of jolts against scrap. Produced by United Engineering & Foundry Co., Pittsburgh, Pa.

Ni-Hard ball outlasts others by 3 to 1 ...breaks 27,000 tons of scrap and still on job

A Ni-Hard® drop ball earns you money because its resistance to abrasion greatly increases its life. Look at this one, for example . . . on an open hearth scrap drop at United States Steel Corporation's Youngstown District Works.

The ball looks battered, with one side slightly flattened out . . . but it should be after the service it has already given:

This Ni-Hard ball has broken up some 25 tons of scrap a day, seven days a week for more than three years.

Balls made of other materials averaged only 13½ months in the same service. Yet after 40 months the Ni-Hard ball is still in use. As a result of its unmatched resistance to abrasion, it still retains its working weight.

You'll profit by using a ball that stays hefty longer as it breaks up your scrap. So specify your next drop ball in Ni-Hard nickel-chromium white

iron. A list of authorized producers is yours for the asking. Write for it now.

*Registered Trademark

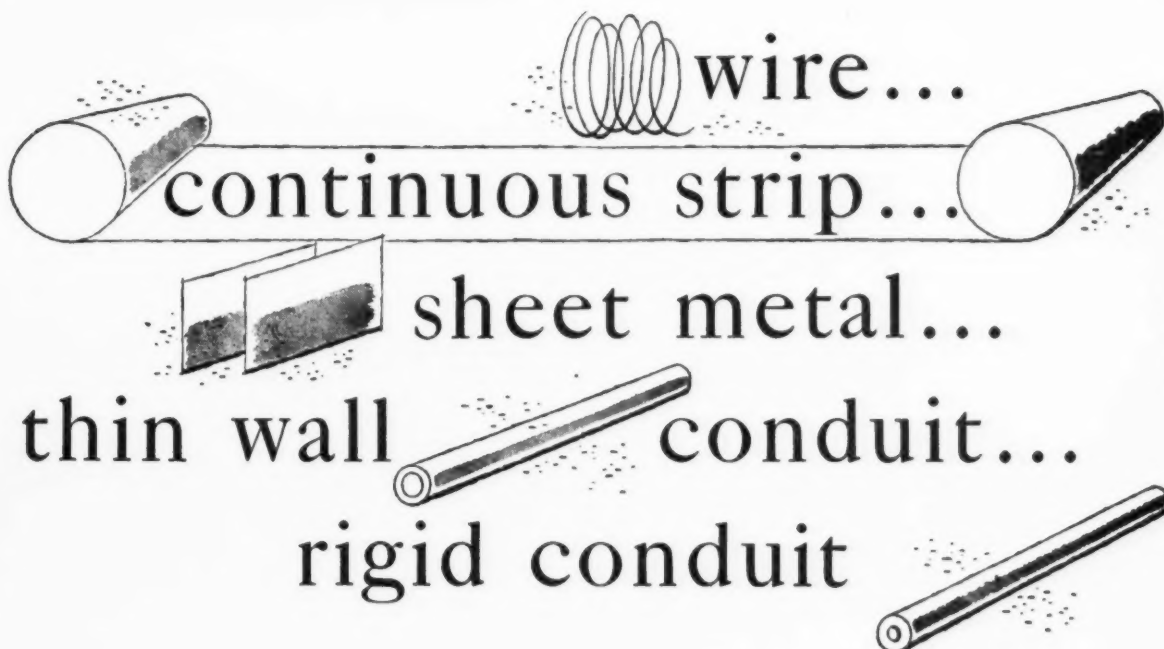


Ni-Hard drop balls come in various sizes, and applications include fragmentation in reclaiming steel scrap from slag, breaking up cast iron scrap, powdering rock and the like. These drop balls were cast by United Engineering & Foundry Company.



THE INTERNATIONAL NICKEL COMPANY, INC. 67 Wall Street New York 5, N.Y.

IF YOU PROCESS...



YOU CAN *Automate* ALL THESE OPERATIONS:

- cleaning
- pickling
- plating
- phosphating
- scrubbing
- paint prep
- electrogalvanizing

For Faster, Better Production . . . At Far Less Cost
with an
H-VW-M CONTINUOUS LINE SYSTEM

WRITE today, at no obligation, for the facts about an H-VW-M System that can bring cost-saving *automation* to your continuous line finishing—a system that can be integrated with your shearing, forming, slitting or annealing operations.

Hanson-Van Winkle-Munning Company, Matawan,
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PLATEMANSHIP—Your H-VW-M combination—of the most modern testing and development laboratory—of over 80 years experience in every phase of plating and polishing—of a complete equipment, process and supply line for every need.

JONES & LAMSON "AUTOMATION"



the man who needs
a new machine tool is
already paying for it

This tape-controlled table eliminates set-up time on small lots

It's natural enough, in a way, to associate "automation" with huge plants and their long, high-speed production lines.

We should also keep in mind, however, that certain "automation" techniques offer tremendous benefits to the *small job shop*. Jones & Lamson research and development have produced remarkable results in applying "automation" to small-lot production.

Are you interested in drastically cutting set-up and change-over time, and greatly increasing your small-lot flexibility? We'd be pleased to show you how the results of our intensive research and development programs can be put to good use in *your* operations.

Write for literature. JONES & LAMSON MACHINE COMPANY, 511 Clinton Street, Springfield, Vermont.

Turret Lathes • Fay Automatic Lathes • Precision Boring Machines • Thread & Form Grinders • Optical Comparators • Threading Dies, Taps & Chasers



ALLENPOINT will give you a bulldog grip at no premium in price!

Allen's scientific redesign of the cup diameter on set screws gives greatly increased resistance to *withdrawal* torque. You can count on Allenpoint Set Screws to stay tighter longer, under heavy strain and vibrations. This dependable premium performance of Allenpoints is yours to use without increasing the cost of manufacturing your products.

Uniform Class 3A Threads

Allenpoints' smooth, uniform threads prevent off-lead conditions like Fig. 1. With Allenpoints, you have full, even contact between the engaging flanks of the threaded members (Fig. 2)—and a tight friction lock over the entire length of the Allenpoint Set Screw.

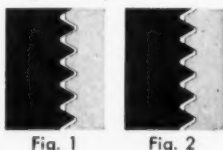


Fig. 1

Fig. 2

Strong, clean, deep sockets allow full wrenching leverage



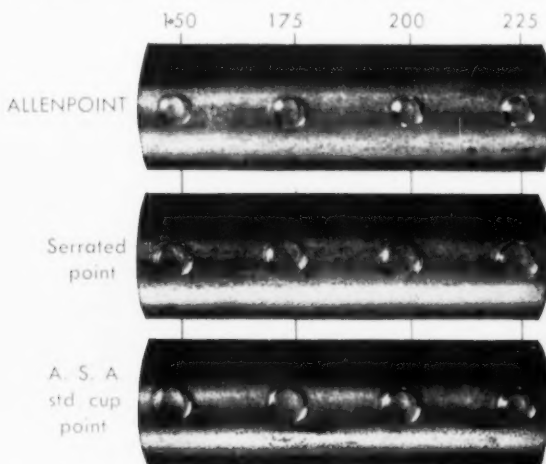
Sockets of Allenpoint Set Screws are cold forged to produce a deeper, smoother socket. No broach chips to interfere with proper seating of the key. This "pressur-forming" preserves the long steel fibers throughout the length of the screw—stronger walls allow maximum tightening torque.

One more full thread on ALLENPOINTS!

Allenpoint Set Screws have one more full thread than serrated point set screws. That means more holding power—especially important when you're using short lengths.



ALLENPOINT's performance compared for you



These actual-size, unretouched photographs show the cup pattern made by Allenpoints, serrated points, and A.S.A. standard cup point set screws in a 3/4" steel shaft. At each degree of tightening force, Allenpoints make a full circle pattern, penetrating deeper for greater holding power.

We'll be glad to send you more information and samples of Allenpoint Set Screws and other Allen Socket Screw products.

Stocked and sold by leading industrial distributors everywhere

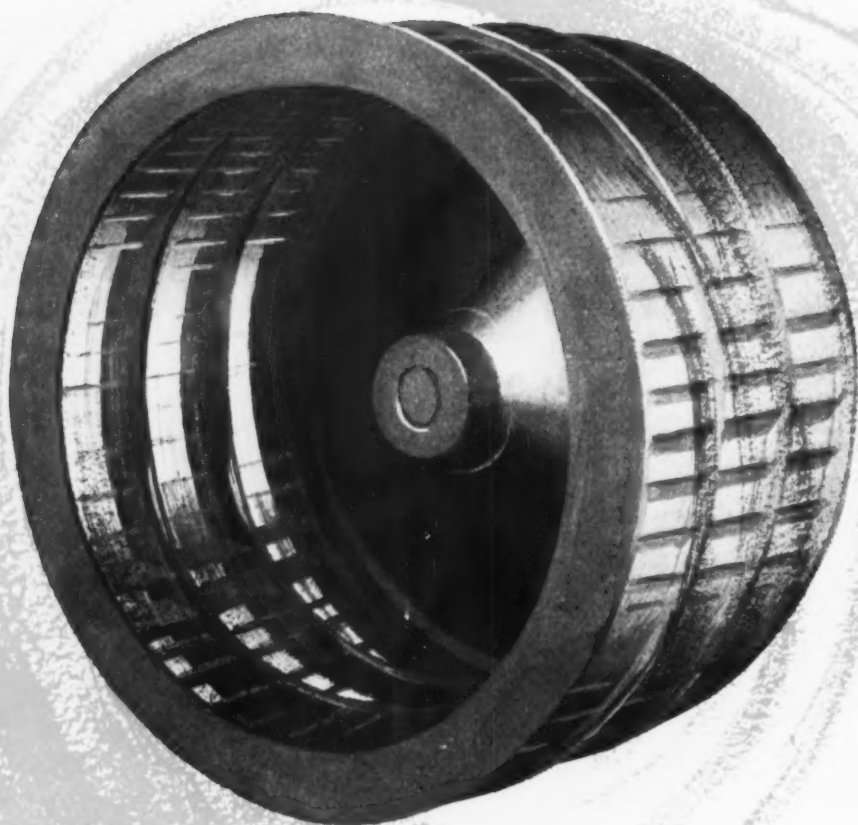
ALLEN

MANUFACTURING COMPANY
Hartford 2, Connecticut, U. S. A.



HEAT • WEAR • CORROSION

HAYNES Alloys solve the



HEAT

*10 Years' Service at 1600 to
1800 deg. F.*

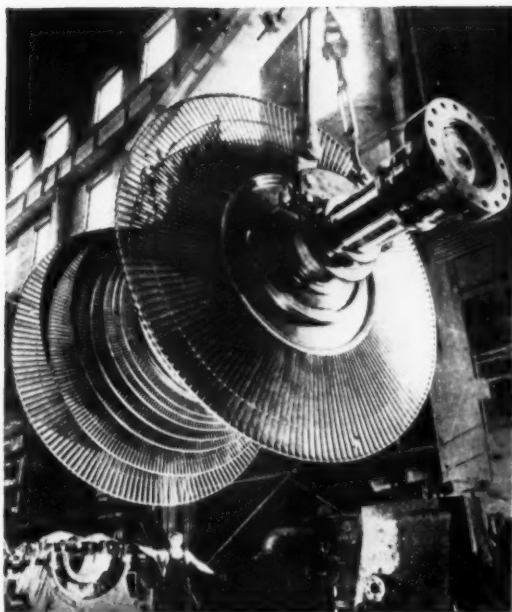
Rotors and impellers made of MULTIMET alloy are being used to circulate the atmosphere inside heat-treating furnaces where temperatures range from 1600 to 1800 deg. F. They are expected to last 10 years even though they are exposed to both reducing and oxidizing conditions.

tough problems

EROSION

Withstands High Velocity Erosion for 19 Years

Blading at the cold end of steam turbines spins at speeds approaching that of a high speed bullet. At these high velocities even small water particles can cause rapid wear on most metal parts. Yet when the leading edges of these blades are protected by a 27-in. strip of HAYNES STELLITE alloy, they remain in operation up to 19 years!



HAYNES alloys give long, dependable service under some of industry's toughest conditions. They operate for long periods of time at temperatures up to 2000 deg. F; they resist the severe corrosive action of many chemicals; and they withstand the wearing effects of abrasion and erosion.

There are over 100 HAYNES alloys—a wide selection that practically guarantees you a tailor-made solution to your heat, abrasion, or corrosion problems. Many of these alloys are available as sheet, plate, bar stock, tubing, wire, and castings, investment castings, welding rods, hard-facing rods, and metal-cutting tools.

For complete details on properties, prices, and forms, write for literature, or contact our nearest sales office... HAYNES STELLITE COMPANY, Division of Union Carbide Corporation, Kokomo, Indiana. Sales Offices in Chicago, Cleveland, Detroit, Houston, Los Angeles, New York, and San Francisco.



CORROSION

Resists Chlorine Compounds at 300 deg. F.

Vessels lined with HASTELLOY alloy C last from 2 to 4 years while handling such severely corrosive media as hydrochloric acid, tri-chlor benzene and other chlorine compounds. Because of the unusual resistance of HASTELLOY alloy C to a variety of corrosives, it is widely used in the Petroleum, Chemical Processing, Metalworking, and many other industries.

HAYNES

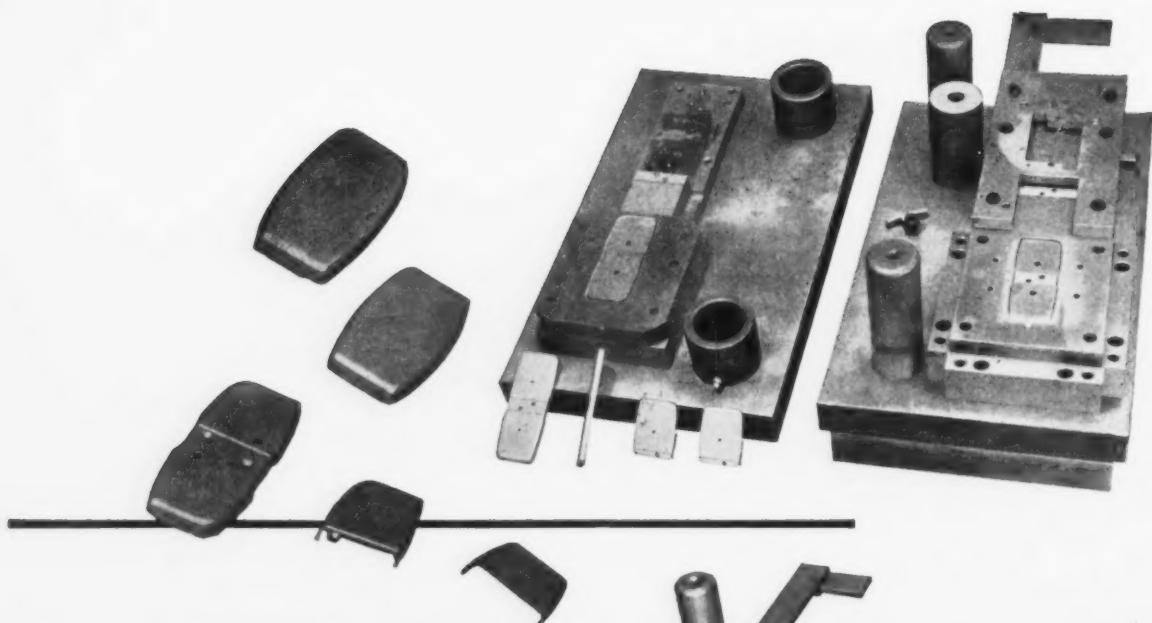
ALLOYS

HAYNES STELLITE COMPANY

*Division of Union Carbide Corporation
Kokomo, Indiana*

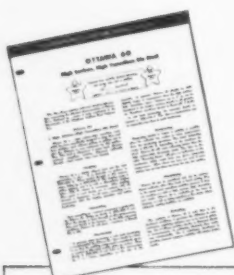
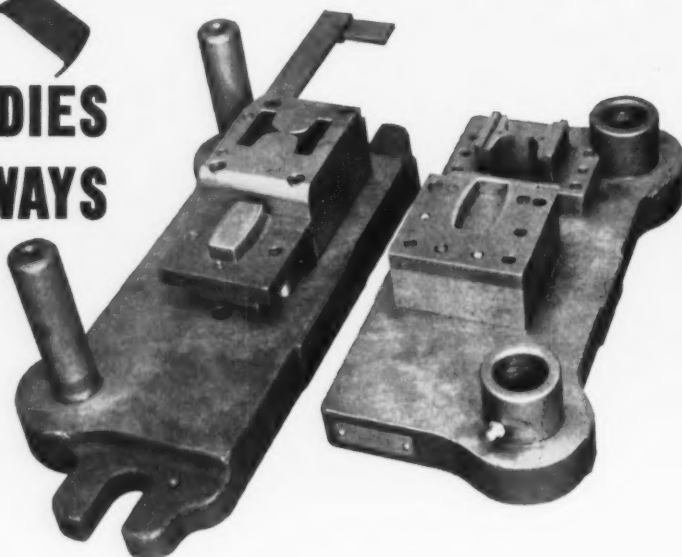


"Multimet," "Hastelloy," "Haynes," and "Union Carbide" are registered trade-marks of Union Carbide Corporation.



These OTTAWA 60 DIES PAYOFF BIG IN 3 WAYS

- ★ Buffing Time Reduced 1/2
- ★ Rejects Reduced 20%
- ★ Stoning and Regrinding of Dies Reduced 75%



Write for BLUE SHEET on OTTAWA 60

This concise four-page folder gives all needed handling and shop treatment details on Ottawa 60. Included is certified laboratory information on physical characteristics, and complete data on forging, annealing, hardening, tempering, etc. Ask for your copy.

ADDRESS DEPT. A-95

One way to increase profits is to reduce finishing costs. That's what a fabricator of hearing aid cases accomplished when he switched from regular die steel to A-L's air hardening Ottawa 60 high carbon-high vanadium grade.

Ottawa 60 dies produced stainless steel cases which were free from galling and scoring—were nearly perfect as they came out of the dies. Less than half the previous buffing time was needed to bring them to the required high finish. Rejects—which ran about 20 percent before the use of Ottawa 60—were reduced almost to the point of elimination. Also, the new

Ottawa 60 dies required stoning and regrounding only a quarter as often as the standard tool steel dies they replaced.

This same manufacturer has passed along significant savings to other customers through the use of Ottawa 60. By practically eliminating rejects due to corner cracking and scoring, customers receive better stamped parts at lower per-piece cost.

Let us show how you, too, can save with A-L tool steels and, at the same time, furnish your customers a better product.

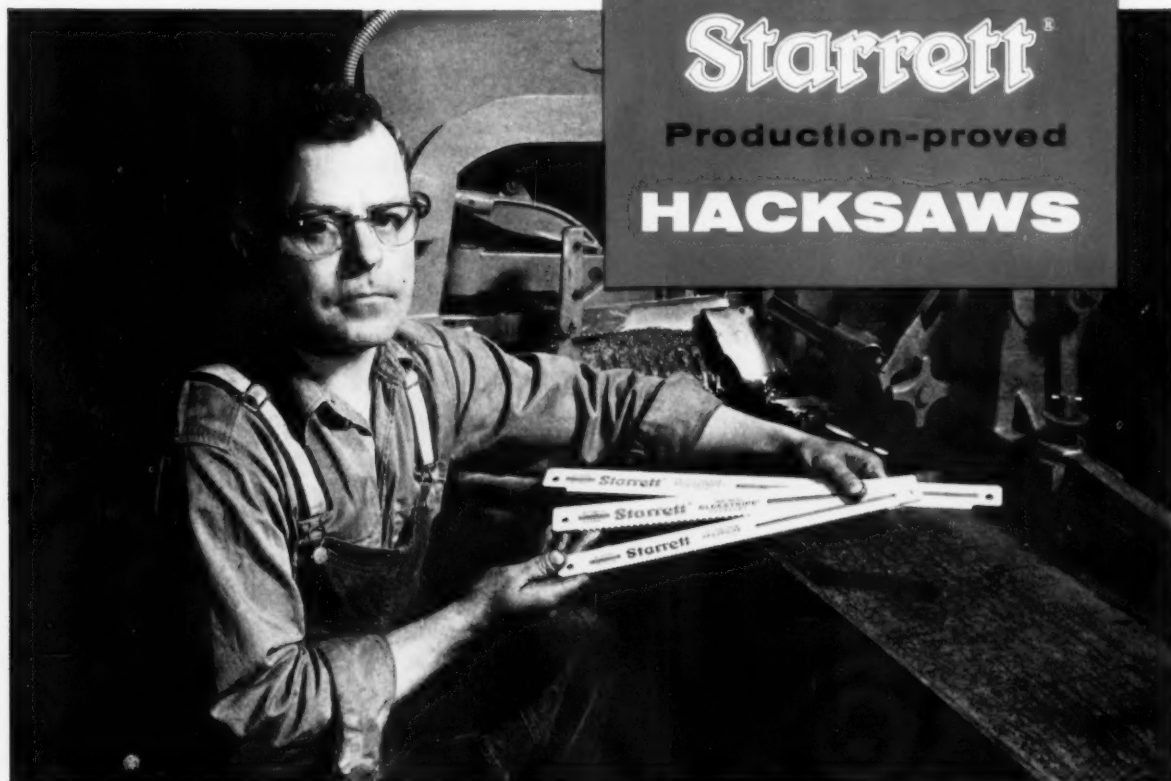
*Allegheny Ludlum Steel Corporation,
Oliver Building, Pittsburgh 22, Pa.*

For nearest representative, consult Yellow Section of your telephone book.

For complete **MODERN** Tooling, call
Allegheny Ludlum



STARRETT PRECISION MAKES GOOD PRODUCTS BETTER



**Named and color identified to help you
specify the right blade for low cost,
fast cutting, long life**

Colorful hacksaw blades with easy-to-remember, colorful names — a plus value that makes Starrett Production-Proved Hacksaw Blades easy to specify and easy for shop men to identify.

Bright yellow blades with the *red stripe* are Starrett REDSTRIPE SM* High Speed Hand and Power Blades . . . extra tough, long-wearing special alloy high speed steel blades recommended for production work and run-of-the-shop jobs.

Yellow blades with the *green stripe* are Starrett GREENSTRIPE SAFE-FLEX* High Speed Hand and Welded Edge Power Hacksaws . . . shatterproof, unbreakable blades — *the safe* blades for heavy feeds, gang sawing and interrupted cuts.

Yellow blades with the *blue stripe* are Starrett BLUESTRIPE* High Speed Hand and Power Hack-

saw Blades made of selected high speed steel especially heat treated for high speed production sawing and hard-to-cut metals.

Your nearby Industrial Supply Distributor has these Starrett Hacksaw Blades in a complete range of hand and power sizes. Call him for quality products, dependable service or send for Starrett Hacksaw Catalog which gives complete application data. Address Dept. IA, The L. S. Starrett Company, Athol, Massachusetts, U. S. A.

*Registered trade names

Starrett

PRODUCTION-PROVED HACKSAWS

World's Greatest Toolmakers



**Visit Booth 1730
National Metals Show**

PRECISION TOOLS • DIAL INDICATORS • STEEL TAPES • GROUND FLAT STOCK • HACKSAWS • HOLESAWS • BAND SAWS • BAND KNIVES



STEEL PRODUCTS... used from the ground up

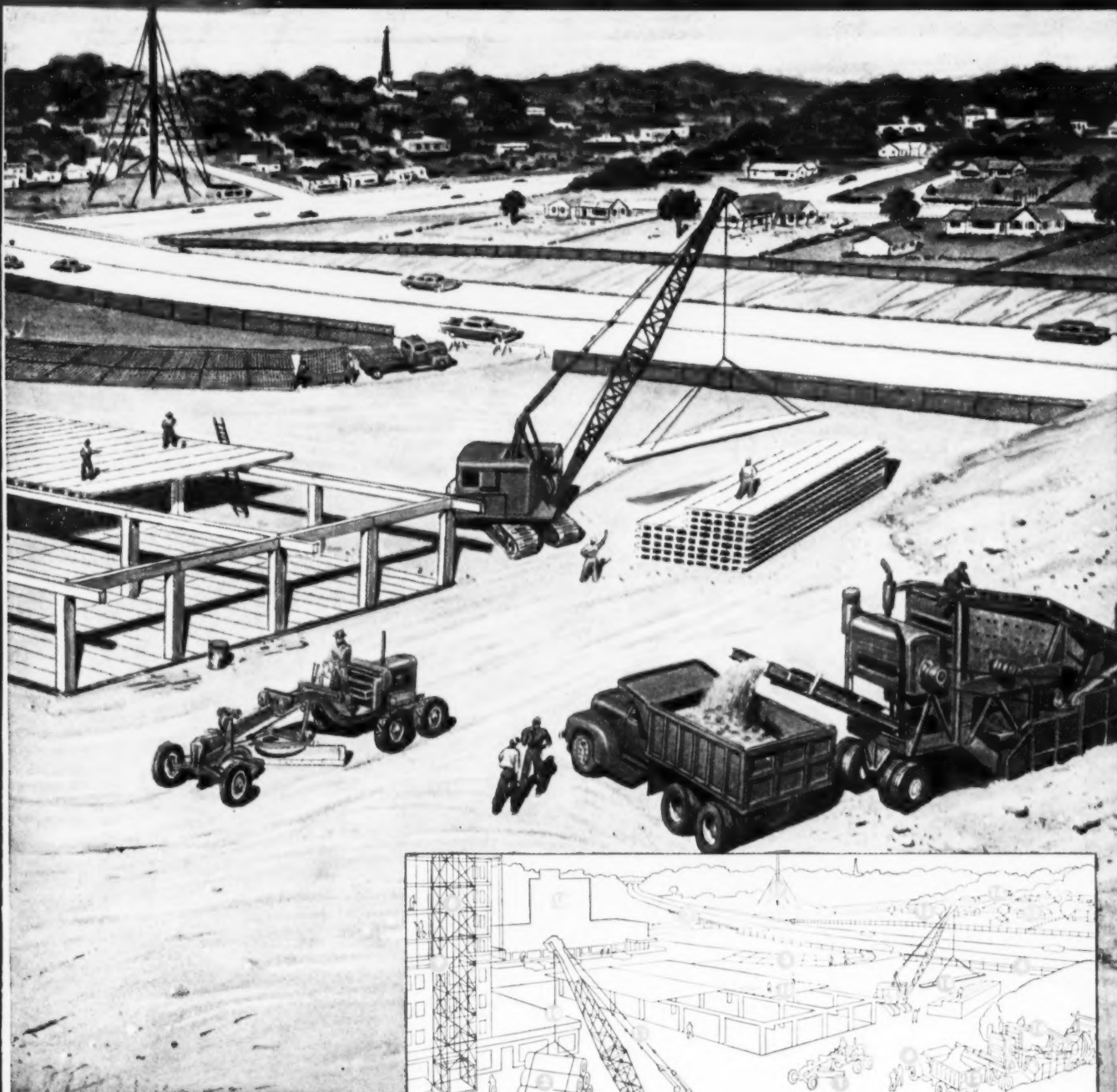
A seemingly endless variety of equipment and materials flow into the construction site for a modern suburban development project. Many of these are made of steel—from structural members to fabricated components—from materials handling to construction equipment. The logistics problem is a

complicated one for all the contractors involved.

That's why many contractors... and other big steel users... are turning to CF&I as a single source for many of their steel requirements. CF&I manufactures a complete range of steel products—those shown here and many more. And

steel buyers know they can count on quick delivery when they order from this completely integrated producer... know they can count on the top quality that has long been a CF&I trademark.

If you use steel in any form it will pay you to contact the CF&I Sales Representative nearest you.



in suburban development

- ① CF&I Cutting Edges
- ② Clinton Welded Wire Building Fabric
- ③ Clinton Welded Wire Road Fabric
- ④ Realock Chain Link Fence
- ⑤ Claymont Flanged and Dished Heads
- ⑥ Wickwire Springs and Formed Wires
- ⑦ Claymont All-Welded Steel Girders
- ⑧ Wickwire Elevator Cable

- ⑨ CF&I Hardware Cloth
- ⑩ Wickwire Wire Rope and Slings
- ⑪ Wickwire Boom Pendants
- ⑫ Claymont Alloy Steel Plates
- ⑬ Gold Strand Insect Wire Screening
- ⑭ CF&I-Wissco TV Guy Wire

- ⑮ Perfection Door Springs and Quick Hitch Gate Springs
- ⑯ CF&I Space Screens
- ⑰ CF&I Galvanized Steel Strand
- ⑱ CF&I Prestressed Concrete Strand
- ⑲ CF&I Reinforcing Bars (in concrete)

THE COLORADO FUEL AND IRON CORPORATION

THE COLORADO FUEL AND IRON CORPORATION—Albuquerque • Amarillo • Billings • Boise • Butte • Denver • El Paso • Ft. Worth • Houston • Kansas City • Lincoln (Neb.) • Los Angeles • Oakland • Oklahoma City • Phoenix • Portland • Pueblo • Salt Lake City • San Antonio • San Francisco • San Leandro • Seattle • Spokane • Wichita

WICKWIRE SPENCER STEEL DIVISION—Atlanta • Boston • Buffalo • Chicago • Detroit • New Orleans • New York • Philadelphia
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NOW—THREE “CHROMTEMP” EXOTHERMIC FERROCHROMES

for large ladle additions—
up to 2% chromium

With these advantages

- uniformly high chromium recoveries—87% to 95%
- close analysis control
- fast solubility
- no weighing—just count cans containing exact amounts of alloy
- palletized shipment for convenient handling

“CHROMTEMP” 5

Adds only 0.05% carbon for each 1.00% chromium addition, a 20-to-1 chromium-to-carbon ratio.

“CHROMTEMP” 8

Adds only 0.08% carbon for each 1.00% chromium addition, a 12.5-to-1 chromium-to-carbon ratio.

“CHROMTEMP” 12

Adds only 0.12% carbon for each 1.00% chromium addition, an 8-to-1 chromium-to-carbon ratio.

Check ELECTROMET—for experienced technical assistance...fast deliveries...a complete line.

Write ELECTRO METALLURGICAL COMPANY, Division of Union Carbide Corporation, 30 E. 42nd Street, New York 17, N. Y. In Canada: Electro Metallurgical Company, Division of Union Carbide Canada Limited, Toronto.

METALS DO MORE ALL THE TIME
...THANKS TO ALLOYS

Electromet
FERRO-ALLOYS AND METALS

**UNION
CARBIDE**



The terms "Chromtemp," "Electromet," and "Union Carbide" are registered trade-marks of Union Carbide Corporation.



"Excellent hoisting qualities... a wonderful machine"

reports R. Litz & Sons Co., Ltd.

Back in December, 1955, R. Litz & Sons Co., Ltd., of Winnipeg, Canada, bought a Lima Type 44 Crane to do the heavy lifting in its building and machinery moving business. Gordon Litz says: "We have found the hoisting qualities of this machine to be excellent. It is also superb for deep trenching when equipped as a pullshovel; we are pleased to express our opinion of the excellent qualities found in our Lima machine."

You will find satisfied owners wherever Limas are found, around the world. For materials handling, excavating or whatever the job, contractors who want speed, reliability and extra capacity all say the same thing. Here are some of the specific reasons why Limas lead the field:

1. *Piston-ring-type dirt seals and retainers in the crawler rollers.*

2. *Moving parts are flame or induction hardened for longer life.*
3. *Main machinery is placed well behind the center of rotation.*
4. *Anti-friction bearings at all important bearing points.*
5. *Big capacity drums and sheaves—easy on cables.*
6. *Propel and swing gears and power take-off are enclosed in a sealed oil bath.*
7. *Torque converter optional on certain types.*
8. *Wherever you are, you can depend on skilled service and nearby warehouse stocks of parts.*

If you want the *best* in shovels, cranes or draglines working for you, it will pay to check the complete line of wagon, truck and crawler-mounted Limas . . . designed and built to give you stamina and long profitable operation on every job. See your nearby Lima distributor, or write Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.

DISTRIBUTORS IN PRINCIPAL CITIES OF THE WORLD

LIMA

SHOVELS • CRANES
DRAGLINES • PULLSHOVELS



BALDWIN-LIMA-HAMILTON
Construction Equipment Division — LIMA WORKS

OTHER DIVISIONS: Austin-Western • Eddystone • Electronics & Instrumentation
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THE HEAVIER THE LOAD...

the more you need HYATTS... because nothing else can equal straight cylindrical roller bearings for sheer load-carrying capacity. That's why many of the world's largest crawler tractors are equipped with HYATT Hy-Rolls.

THE HIGHER THE SPEED...

the more you need HYATTS... because they are precision-built with painstaking control of internal clearances to run smoothly even at 40,000 rpm, as in this Solar portable gas turbine pump developed for fighting fires.



Cylindrical

THE MORE YOU NEED

HY-ROLL BEARINGS



NON-SEPARABLE TYPE

SEPARABLE
OUTER RACE

SEPARABLE INNER RACE

Heavier loads and higher speeds, which must often be accommodated in more compact housings than ever before, are causing problems for many a design engineer these days. If you're among those who are finding that previously-used bearings are no longer good enough, it's time to switch to HYATTS. In America's most complete line of straight cylindrical roller bearings you'll find space-saving separable types with ample capacity to carry your radial loads, or flanged race types which will take a surprising amount of thrust. When you lay in HYATT Hy-Rolls you make sure of longer, smoother performance at the lowest cost per hour of service. Ask your nearest HYATT Sales Engineer for recommendations — you'll find him mighty helpful! Hyatt Bearings Division, General Motors Corporation, Harrison, N.J.; Pittsburgh; Detroit; Chicago; and Oakland, California.

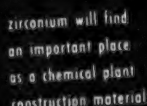
THE RECOGNIZED
HYATT

LEADER

IN CYLINDRICAL BEARINGS



HY-ROLL BEARINGS
THE "WORKHORSES" OF
MODERN INDUSTRY



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WHEELABRATOR STEEL SHOT cuts abrasive costs for all types of foundries

GOLDEN FOUNDRY COMPANY, INC., COLUMBUS, INDIANA

A PRODUCTION JOBBING GRAY IRON FOUNDRY

reduces abrasive consumption 45%
saves \$4957.00 annually

Tests made for one year between heat treated shot and Wheelabrator Steel Shot in a 4-wheel blast machine conclusively proved to the Golden Foundry Company, Columbus, Indiana that Wheelabrator Steel Shot saved them 45% in abrasive consumption. Whereas 18 lbs. of heat treated shot were required per wheel hour, only 10 lbs. of Wheelabrator Steel Shot were consumed for the same period. The actual savings came to 28.4 cents per wheel hour, or \$4,957.50 for just one machine in one year. This is based on 4,364 hours of operating time multiplied by 4 wheels for a total of 17,456 wheel hours.

Similar tests by other foundries have shown similar results — some making even more than the 45% savings registered by Golden Foundry Co.

Wheelabrator Steel Shot has brought abrasive savings and reduction in parts wear and maintenance expense to all types of foundries — steel, gray iron, malleable, non-ferrous, large, small, jobbing, production, etc. You, too, can save with this versatile steel shot.

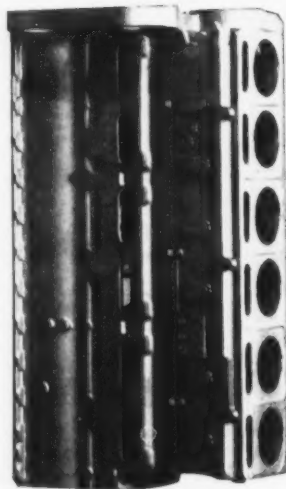
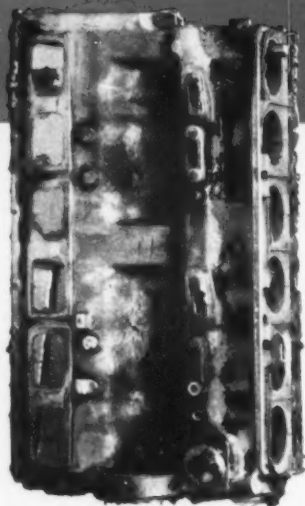


For more information,
send today for Catalog 89-B.

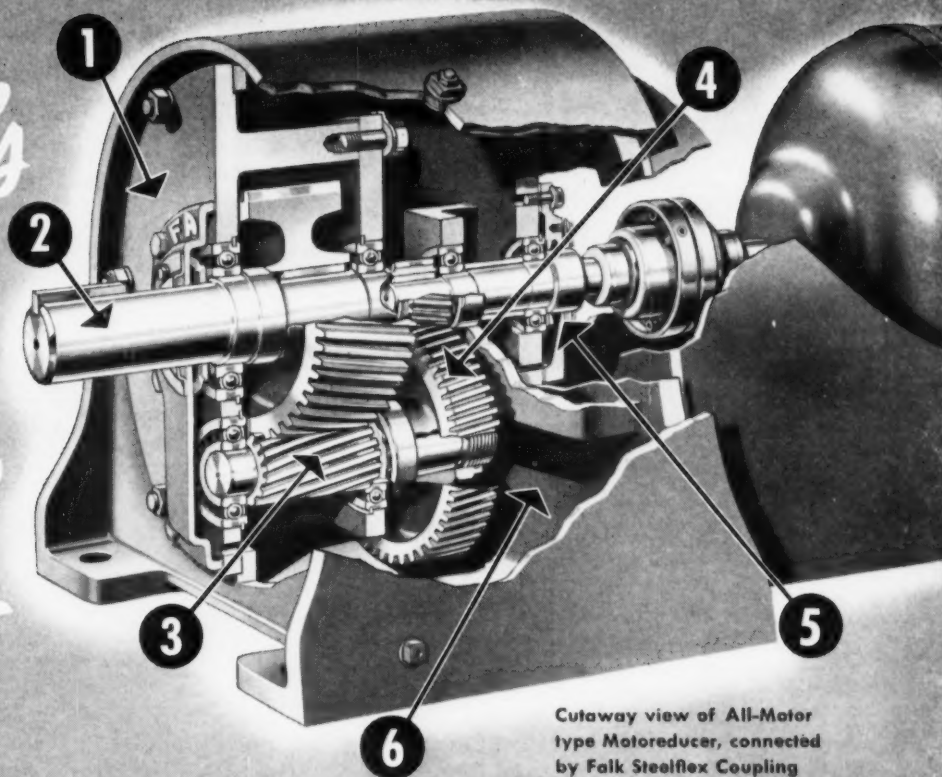
WHEELABRATOR
CORPORATION

510 South Byrkit Street, Mishawaka, Indiana

World's Largest Manufacturer of Steel Shot and Airless Blast Cleaning Equipment



*Here's
the
inside
story—*



Cutaway view of All-Motor type Motoreducer, connected by Falk Steelflex Coupling to standard NEMA frame motor

WHY Falk Motoreducers give better service—have longer life

Here is the "inside story" behind the all-steel All-Motor type FALK Motoreducer's universal reputation as a gear drive unmatched in quality, efficiency, dependability, ease of maintenance and long life. These "In-built" factors are—

- 1 ALL-STEEL HOUSINGS.** Rugged, strong, rigid...all parts are manufactured from heavy steel plate, formed and welded in the Falk Weld Shop.
- 2 LARGE OVERHUNG LOAD CAPACITY.** Large shafts, oversize bearings...rigid mountings with wide bearing spans to handle maximum applied loads.
- 3 PRECISION GEARING.** Heat-treated alloy steel gearing, precision cut and shaved after heat treatment to eliminate distortion. Quiet, crown-shaved pinions.
- 4 EXTRA-CAPACITY GEARING.** Special extra-capacity gear-tooth form with larger contact area gives greater strength, higher load-carrying capacity.
- 5 SEALED HOUSINGS.** Splashproof, dust-proof, oil-tight construction. Dual closures and one-way vents keep oil in, dust and moisture out.
- 6 POSITIVE LUBRICATION.** Large sump capacity...oil-tight construction assures clean lubricant...revolving elements lubricated by direct dip.

When you buy or specify the All-Motor type FALK Motoreducer, you get all these—plus the tremendous advantage of full interchangeability of motors. Switch motors as desired—use any make, style or type of standard foot-mounted motor within the unit's AGMA rating—with a minimum of difficulty or "down time."

Available in sizes up to 75 hp—with or without motor—from convenient factory, field or distributor stocks, from coast to coast. **Write for Bulletin 3100.**



60,000 HOURS WITHOUT A FAILURE!

Sixty thousand hours is a lot of hours—but the FALK Motoreducer in the unretouched photo above has served that long without failure or need of repair.

This 3 hp unit is one of over 60 FALK Motoreducers in daily service in an Eastern plant of a large milling company, whose president says, in part:

"One of the main advantages of FALK Motoreducers is their adaptability to any motor. Reducers and motors can be easily interchanged... Our service records confirm the wisdom of our choice of FALK equipment as our standard."

FALK

...a good name
in industry

THE FALK CORPORATION, MILWAUKEE, WISCONSIN
MANUFACTURERS OF

- Motoreducers
- Speed Reducers
- Flexible Couplings
- Shaft Mounted Drives
- High Speed Drives
- Special Gear Drives
- Single Helical Gears
- Herringbone Gears
- Marine Drives
- Steel Castings
- Weldments
- Contract Machining

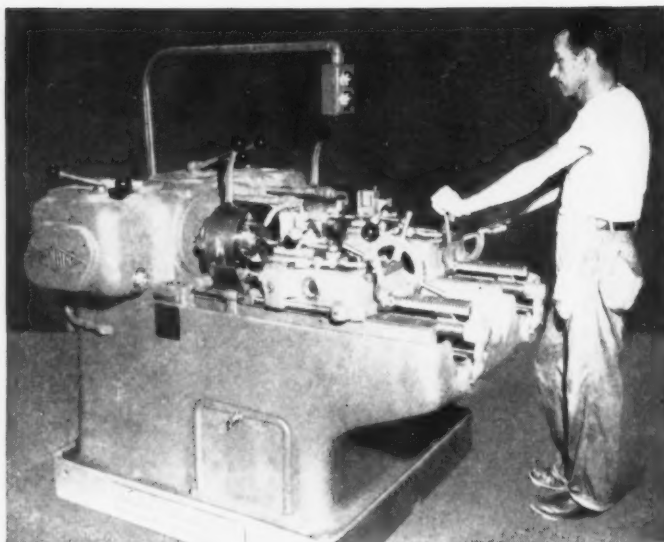
FASTER TURNING

Using



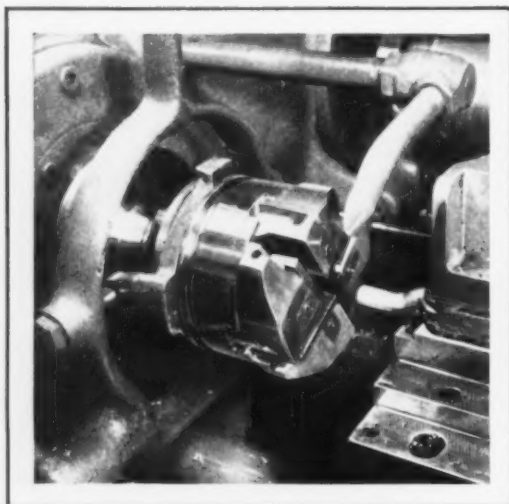
CUTTING TOOLS

Simultaneously



BY turning, facing, and chamfering on Landis Threading Machines, automotive parts production at Thompson Products in Detroit has been substantially increased. This **LANDIS Hollow Milling** technique makes large out-put increases possible by applying a number of simultaneously-functioning cutters, thus multiplying the feed rate of a single tool.

The illustrations show one of these parts, steering links, being turned and faced on a LANDMACO Double-Spindle Leadscrew Threading Machine. SAE 1040 steel forgings are turned ($1/32$ " stock removal) $1\frac{1}{8}$ " in length and faced by four special turning cutters in $7/8$ " V LANCO Hardened and Ground Heads. Production regularly averages 200 pieces per hour, with the $5/8$ " turned diameter held within $\pm .004$ ". Four hours production is obtained between cutter grinds.

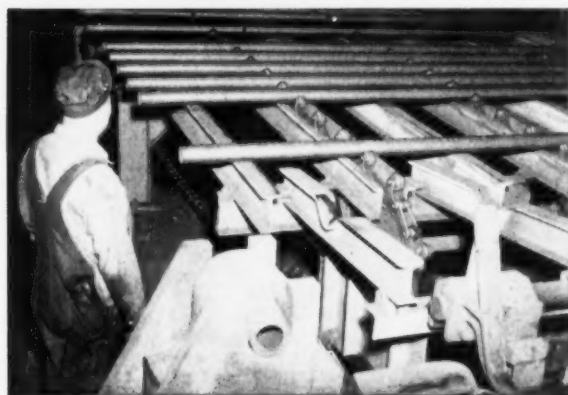


THE WORLD'S LARGEST MANUFACTURERS OF THREADING EQUIPMENT - CUTTING - TAPPING - GRINDING - ROLLING

This LANDIS technique offers important advantages over other methods of turning, forming, and facing. The use of four or six simultaneously-functioning cutters, in addition to increasing production, reduces tool cost and workpiece spoilage to the minimum. The diametrically-opposing cutters evenly distribute cutting strains and maintain proper work alignment. LANDIS Cutters, available in a wide variety of styles, are economical for they are usable for most of their length with only a simple regrinding of the rake angle.

Additional information will be sent on request—please include specifications when writing.

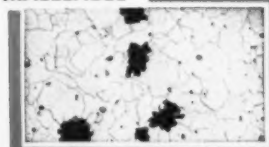
Specify longer-lasting Link-Belt Promal chains for extra durability



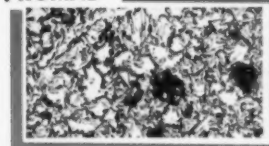
Promal chain controls uniform cooling of pipe

An inclined conveyor, using Link-Belt Class 1100 Promal chain with attachments, permits an Ohio steel mill to control cooling of longer tubes than previously possible. Pipe is received from hot finishing operations at temperatures up to 1800 F. Controlled chain speed permits uniform cooling of outer tube periphery.

MALLEABLE



PROMAL



MICROPHOTOS show difference between ordinary malleable iron and Promal. Upper—white areas in malleable microphoto represent "free-iron" . . . black shows soft nodules of carbon. Lower—the dark areas in the Promal structure show stronger, stiffer reinforcing material which strengthens metal and resists distortion and wear.

UP TO 475 TONS per week of steel mill scale are recovered by this Link-Belt system. Promal chain on Straightline Collector moves scale from settling tanks to discharge conveyor. Promal is especially suitable for long, heavy-duty conveyors and elevators.

Specially heat-treated malleable iron provides extra wear resistance

Fewer conveyor shutdowns and minimized replacements are economies realized by users of Link-Belt Promal chain. Its greater strength absorbs continuous impact loads—and wear resistance supplies the durability to cope with severe abrasion.

Promal is more than a partially annealed or surface-hardened malleable iron. Developed by Link-Belt, this specially heat-treated malleable iron is actually transformed into a metal of radically different physical properties. Promal, because of uniform micro-structure throughout its whole section, provides greater ultimate strength, higher yield point, exceptional fatigue resistance and a remarkable capacity to withstand abrasion.

For unusually abrasive or mild corrosive conditions, Promal chain can be furnished with "file-hard" surfaces. Copper bearing or special alloy content also available.

Where and how to apply Promal in the metal working industry

Choose Link-Belt Promal chains for highly abrasive conditions—for extra strength and wear resistance demanded by heavy loads or long, sliding conveyors. They last much

longer . . . cost but a little more.

The wide range of Link-Belt chains available in Promal includes all types of cast and combination chains.



HEAT-RESISTANT PROMAL is recommended for temperatures up to 1000 F. This SMGL-618 Promal chain conveyor with riser attachments picks up and conveys sheet steel through furnace. Chain has operated continuously for two years without failure.

HEADQUARTERS for chains, sprockets and other Link-Belt conveying and mechanical power transmission products is your nearby Link-Belt factory branch store or authorized stock-carrying distributor.

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities, Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

LINK-BELT

CHAINS AND SPROCKETS



REDUCE REJECTS

...with fasteners that assemble easily

Ferry Cap cuts no corners when it comes to accurate threading and close inspection. Ferry Cap fasteners assemble smoothly and quickly because they are precision made and because inspection takes place not once, not twice, but at every stage of manufacture

—from raw material to finished product.

You'll like the fasteners you get from Ferry Cap... and you'll like our speedy delivery, too!

THE FERRY CAP & SET SCREW COMPANY

Makers of the famous Countr-Bar® Screw for socket head applications.

2157 SCRANTON ROAD

• CLEVELAND 13, OHIO

FERRY CAP

is geared to FASTER SERVICE



designed and built by . . .

UNITED[®]

**HIGH SPEED
5-STAND
TANDEM COLD MILL**



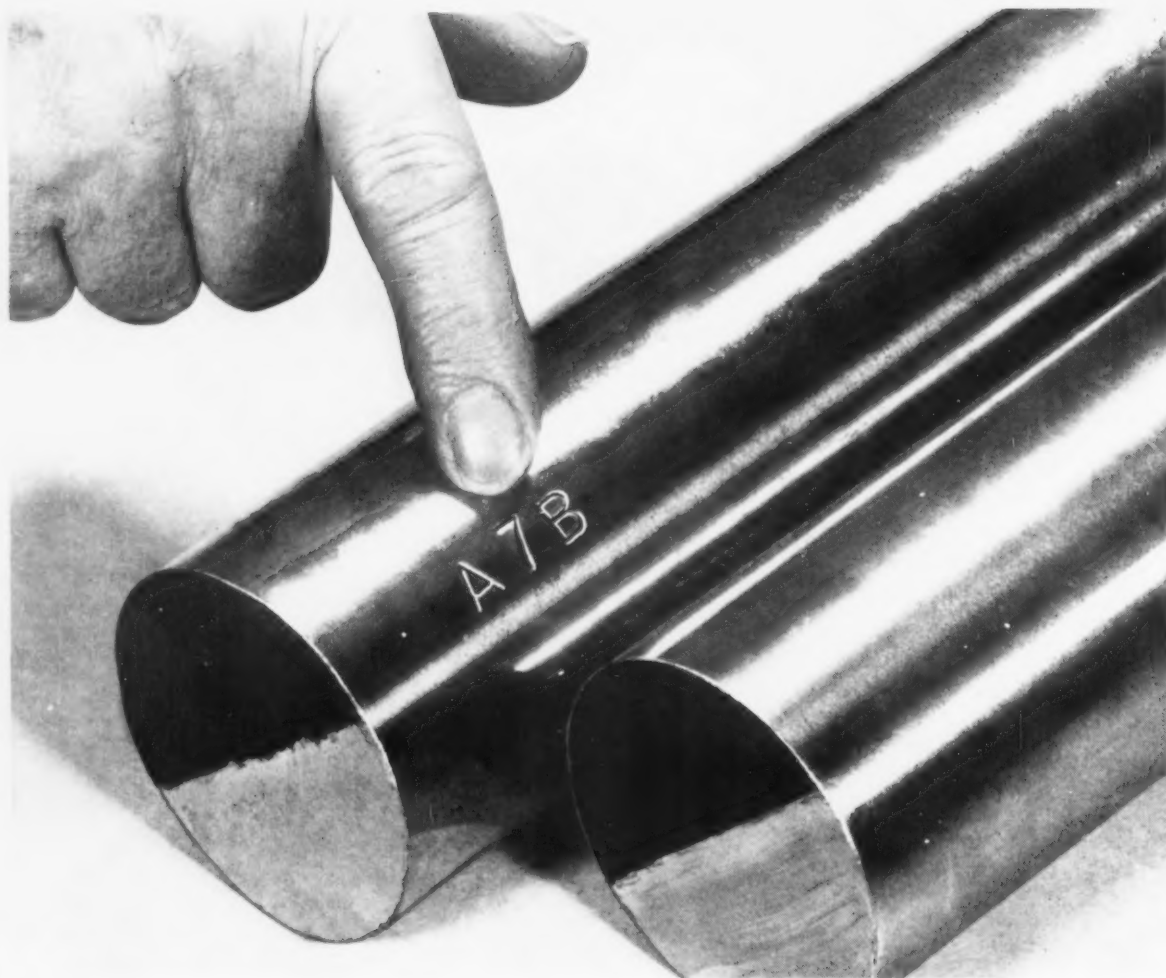
ENGINEERING AND FOUNDRY COMPANY

PITTSBURGH, PENNSYLVANIA

Plants at Pittsburgh, Vandergrift, Youngstown,
Canton, Wilmington

SUBSIDIARIES: Adamson United Company, Akron, Ohio
Stedman Foundry and Machine Company, Inc., Aurora, Indiana

Designers and Builders of Ferrous and Nonferrous Rolling Mills, Mill Rolls,
Auxiliary Mill and Processing Equipment, Presses and other heavy machinery.
Manufacturers of Iron, Nodular Iron and Steel Castings and Weldments.



With ONE you know, the other you don't

Two alloy steel bars of the same type can differ markedly in hardenability—if they come from different furnace heats. But with Ryerson 8-step quality control, there's no need to guess. Every Ryerson alloy bar is positively identified by heat number. You get a "heat history" report with every order.

Here's what the Ryerson report tells you:

1. **Heat analysis.** Not just the chemical range for the type of alloy, but the specific analysis of

the heat from which your steel was rolled.

2. **Tested Hardenability.** Not just the average hardenability for the alloy, but the actual Ryerson-tested hardenability for the particular heat... as quenched and at three draw temperatures.

You can always be *sure* with alloys from Ryerson. On your next order, get the protection offered by the Ryerson Certified Alloy Steel plan. It costs no more. Call your nearby Ryerson plant.



RYERSON STEEL

Principal products: Carbon, alloy and stainless steel—bars, structurals, plates, sheets, tubing—aluminum, industrial plastics, metalworking machinery, etc.

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • WALLINGFORD, CONN. • PHILADELPHIA • CHARLOTTE • CINCINNATI • CLEVELAND • DETROIT • PITTSBURGH • BUFFALO • INDIANAPOLIS • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

Low-Cost Pure Metals

Titanium, zirconium, chromium, hafnium, niobium and cadmium can be produced from their oxides by a new process which is both simple and inexpensive. All of the oxygen is removed by reacting these metallic oxides with aluminum. The low-cost technique is said to yield purer metals than could be obtained by previous methods.

Plastic-Shrink Formula

It's now possible to find the exact shrinkage allowance needed when casting plastic tools and dies. Research at a leading engineering school turned up a formula to lick one of plastic tooling's big headaches. It's simple enough for any shop to use and should save a lot of money now wasted by guessing wrong on shrink allowances.

Aluminum Imports Hurt

Imported aluminum sheet continues to plague Eastern distributors, who are looking to U. S. mills for helpful action. One producer says it may move "to do something about it" in the next few weeks, but promises not to ask for tariff protection. Meanwhile, another producer is reportedly dickering to import Japanese sheet to West Coast warehouses. Howls of anguish can be expected from other U. S. mill sources if such a deal is made.

Go Easy on Rocket News

The Pentagon is stepping gingerly in easing its secrecy restrictions on military rocket tests. New policies will permit identifying the weapon and giving the public some clues as to its performance. But the publicity lid will not be lifted all the way for fear that the armed services will try to outdo one another with claims and counter-claims.

Wildcat Strikes Mount

Work force reductions at steel mills in recent months have been accompanied by a rash of wildcat strikes. One major producer has had more

than 130 work stoppages this year. Another mill faced with the same problem feels it has cleared the air by sitting down with union leaders and spelling out the economic facts that go with reduced sales.

New Plastic For Builders

A plastic flashing, said to be more resistant to water penetration than other materials, will soon be available. Its prime market target will be the construction industry. The plastic requires no shop fabrication to fit it to almost any construction shape. Its elasticity prevents joints from breaking, and it will seal itself around punctures made by nails or other objects.

Plate Titanium Cheaply

Thin layers of titanium can be rapidly and inexpensively applied to steel by a fused-salt electrolysis technique. The cladding method literally diffuses titanium into the steel to produce a firm bond. Thus the base metal gains all the corrosion resistant properties of titanium itself, although only a small amount of titanium is needed.

Tax Break For Research?

The White House is thinking about asking Congress to allow income tax deductions for both corporate and individual contributions to research, development and scientific education programs. The belief is that such a tax break would stimulate scientific research greatly without resulting in any significant drop in federal revenue.

Watch Missouri Iron Ores

Despite the slow Fall buildup in the steel business, there's considerable interest shown in some Missouri deposits of fairly rich iron ore. One factor putting the lid on more active interest at the moment is the tight money situation. It's really a problem with those mills that are paying off the costs of recent expansion programs. In one case, an outside firm is putting up property cash just to get the ore delivery contract.

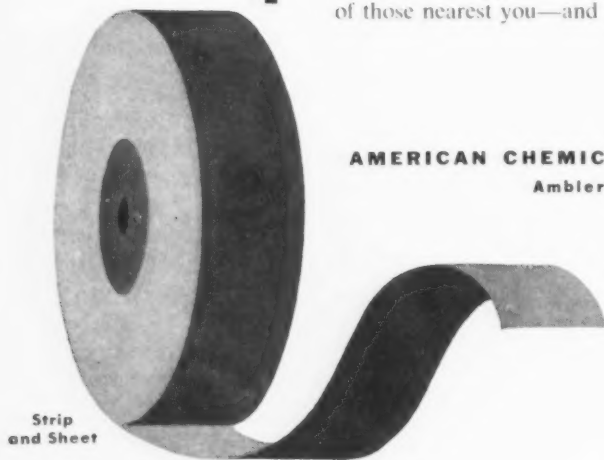
SPECIFY STAINLESS STEEL STOCK COATED WITH NEW GRANODRAW SS®

—chemical conversion coating aids cold mechanical deformation, protects against surface pitting in storage.



For the first time you can safely specify precoated stainless steel tube, wire, strip and sheet from your mill source—and avoid a costly installation of process equipment in your plant. The chemical conversion coating formed in the new Granodraw SS process facilitates drawing, stamping, cold heading, and cold forming operations, even after the stock has been stored. It also protects the stock against pitting in transit and storage.

Mills can supply this precoating service. Call on us for the names of those nearest you—and for complete information.



AMERICAN CHEMICAL PAINT COMPANY
Ambler 20, Pa.



Detroit, Mich. • St. Joseph, Mo. • Niles, Calif.
Windsor, Ont.

New Chemical Horizons for Industry and Agriculture

Six Steps Toward Strengthening Your Market Position

Selling

Be sure you are equipped to reach and sell all of your market potential.

Costs

Correct excessive costs where you find them. Try to anticipate and avoid higher costs before they develop.

Product Scope

Determine if your present line is broad enough to serve your customers best—and most profitably.

Research

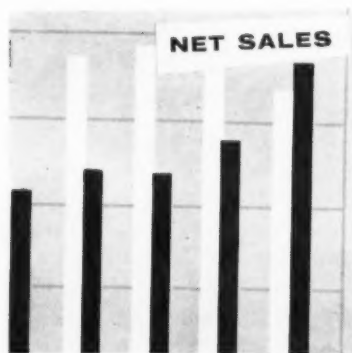
A company can't sell aggressively if it is always following others. New products stimulate sales forces.

Financing

If a company wants to grow, it will have to put money into the business. Make sure your financing method is right for your company.

Executives

Strengthen your executive lineup if necessary. A company should give more than passing thought to board members.



■ Are you neglecting important markets in your own backyard?

In these days of tightening competition in most metalworking markets, the temptation is to look far afield for new areas to develop. But in many cases, you can find a good market potential in developing more fully your own product lines and market range.

A study of three Pittsburgh area companies shows how stricter attention to markets and products

brought increased sales without radical product shifts.

Case Studies—The three companies are Duff-Norton Co.; Pittsburgh Screw & Bolt Co.; and the A. M. Byers Co. All faced what apparently were constricting markets.

Duff-Norton faced a shrinkage of its main market when new railroad techniques reduced the need for rachets and jacks. To take up the slack, the company began pushing worm gear units and went after new markets for its existing line of jacks. Sales of worm gear jacks jumped 400 pct in three years. Overall sales are up 18 pct this year after a 25 pct hike in 1956.

Pittsburgh Screw & Bolt found that higher freight rates increased the importance of large-quantity shipments. The company broadened its product line, now will hold last year's 8.5 pct sales gain despite a

general easing in demand for fasteners.

A. M. Byers faced a lagging steel demand with a limited product range and premium prices. The company tightened cost control, equalized prices, broadened its steel product line. Sales have increased sharply over the past three months.

Won't Stand Pat—None of these companies is closing its doors on completely new products.

"We were never more ready to explore the unknown," says Duff-Norton president Walter Floyd. His company spent \$100,000 on research and development last year; it took on a completely different line in 1955 by acquiring Colling Hoist Co.

But the point is a company should make sure it is getting maximum mileage out of existing product lines and markets. If you're missing bets in the field where your skills and experience lie, you may

find rough going in strange areas.

You can't be sure you're making the most of your position without running a check of vital functions. Here's a rundown of some of the trouble spots, and steps that paid off for these companies.



Sales ✓

Sales for 1956 established a record the preceding year.

Competition has been, and a high level of business activity and position resulted in a sales curve year.

While a number of new products could be singled out as being

- Are you equipped to reach and sell all potential customers?

Duff-Norton had been making worm gear jacks for years, but usage was confined to the aluminum industry. By training the sales force in engineered selling and providing a backup of sales engineers, the company was able to uncover a big market for precision lifting equipment.

A. M. Byers has obtained quick results from the beefed-up sales force of its steel department. Steel sales have increased sharply over the past three months.



tribution to sales growth with the ethylene, a new latex for additional weathering properties, two new

Costs ✓

Our equity in the net earnings totaled \$3.3 million. Only the \$1 million has been included in our statement of

Dow Corning Corporation, Works, continued to make excellent family of silicone products.

- One good way to lick cost problems is to spot and prevent potential

production snarls before they develop. This takes energy and foresight. Pittsburgh Screw & Bolt moved decisively to maintain efficiency last year when two of its plants began running out of space.

There was no room for additions, so the company decided to erect a new plant on a more open site. It plans to move all machinery from the old location to the new plant, but still scheduling a high rate of production during the move.

A. M. Byers had a different sort of a problem, complicated until recently by a stockholder fight. The company was working with a bad cost situation in its steelmaking operations. Prices were higher than the competition and in times of easing supply, sales fell off sharply.

Byers corrected its cost bulge in a hurry by putting teeth in cost controls. Recently the company came out with a new list of prices for its steel products. It is now fully competitive.



The general financial condition prepared to meet presently conditions

Products ✓

Chemicals

Our diversified line of chemical products is a vital nucleus of our business. The organic group led in growth a few items reach more direct trial a few items reach more direct ethylene glycol antifreeze paid off previous year. Similar efforts to bring to show results as sale of oil appreciably. Our new synthetic glycol year and should contribute

- A company that can not fill a customer's complete needs in its field may be at a serious disadvantage. The customer, for example, may be losing out on quantity discounts and shipping costs by dealing with a supplier whose line is incomplete.

In line with this thinking, Pittsburgh Screw & Bolt last year acquired the fastener division of Oliver Iron & Steel. New facilities were put to work making cap screws—a new product for Pitts-

Case Histories:

burgh Screw & Bolt. This year the company took over Southington Hardware, thereby gaining a line of screws and bolts under 5/8 in. New products have helped in the strong sales showing this year.

A. M. Byers has improved plate mills to permit a 40 pct increase in available lengths of alloy plate; a 100 pct increase in available lengths of carbon plate. The company has added a new abrasion-resistant alloy and recently came out with a plastic pipe.



education. We have budgeted \$80,000 for ships, fellowships and direct grants. \$160,000 in support of university activity on our part but is a much

Research ✓

The growth of Dow Research building. A research laboratory at Sarnia, Ontario plant of Dow Chemical. Meanwhile, at Midland, the research laboratory, polymer research

- If a company is consistently behind the parade on new products, its research is probably lagging. This is a weakness that can cripple your company.

"A company can't sell aggressively if it is always in the position of following others," says Donn D. Greenshields, president of Pittsburgh Screw & Bolt. This argument for vigorous research is echoed by Duff-Norton's Walter Floyd, who goes on to point out that new and improved products are always a tonic for the sales force.

First step in starting a new research program is to identify the area of study. Duff-Norton set the outer boundaries of its formal research after considering the whole lifter field. It decided to put its main effort behind worm gear jacks,

How Three Companies Met Tighter Competition

rather than the hydraulic or ratchet type.

"The further our program advances, the more opportunities we see," says Mr. Floyd.



Finance

As stated in our last annual report, the Company has made further reductions in long-term debt. Common Stock of more than \$17 million made a total reduction during the year. The Company had \$160 million of long-term debt at the end of 1956.

In addition the Company paid off \$50 million of debt which was outstanding at the end of 1955. The amount of \$50 million has been set aside for the purpose of capital expenditures for the year 1957.

■ If a company wants to grow faster or stop regressing, it is almost certainly going to have to put more money into the business. Growth within traditional product lines is probably less costly than outside diversification, but any type of progress entails spending.

One source of cash is earnings, and most well-run companies have been retaining larger portions of revenue than in past years. In 1956, Pittsburgh Screw & Bolt retained the largest percentage of its earnings of any year for the past ten. In addition, a \$1.5 million depreciation and amortization allowance

was the largest ever for the company.

Duff-Norton earnings increased by \$2.10 a share last year. All but 50¢ of the increase was retained in the business. Byers declared no common dividend in 1956, a year when earnings jumped more than \$500,000.

For acquisition and other unusual outlays, outside financing of some sort is generally needed. Banks and other money sources will still back good companies, but competition for money is still keen.

One executive warns against loans that run too long and those where payments exceed the earnings of facilities represented.

In providing for its new plant, Pittsburgh Screw & Bolt authorized a debt of \$7.5 million. For its Cofling acquisition, Duff-Norton obtained a 10-year bank loan of \$1,250,000.

Equity financing is being used to good advantage by many companies today, not as a direct cash source, but in stock transfer arrangements. Pittsburgh Screw & Bolt went this route in acquiring the Southington Co. About 20 pct of the Duff-Norton purchase of Cofling was in stock form.

With money continuing to be extremely tight, financing is now one of business's major problems. Great care should be used in financing new programs of expansion.

The third furnace will eventually increase the plant's annual steel ingot tonnage and make possible greater utilization of finishing facilities.

Canned Concentrate

An industrial research grant from U. S. Steel Corp. to the University of Wisconsin has paid off in the development of an improved concentrated sterilized milk.



DIRECTORS

DIRECTORS

Earl W. Bennett *Chairman*
Carl E. Allen
E. O. Barstow
A. P. Beutel
R. H. Boundy
Calvin A. Campbell
R. L. Curtis

■ At one time or another, most companies will have to shore up their executive lineup. Frequently, this can be done from within the company itself. But frequently a company will have to call in outside reinforcements.

In addition to its executives, a company should give more than passing thought to board members.

"Go out and get men who are capable and interested," says one company head. He admits this can be a job; most capable men are overworked. But there is no point in having a big name if the man does not have the time and interest for your company.

Reprints of this article are available as long as the supply lasts. You may obtain a copy from Reader Service Dept., The IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.

New Blast Furnace At Fairless Works

Patricia, the new, third blast furnace at the Fairless Works, U. S. Steel Corp., will increase the plant's iron making capacity by 50 pct.

The new furnace, named after the granddaughter of Benjamin F. Fairless, former chairman of U. S. Steel, has a 28-ft hearth and a daily capacity of 1600 tons.

The new product can be canned, and will still keep its fresh milk characteristics for several months even without refrigeration.

Production on a commercial scale will require the development of factory size equipment for packaging. Costs are said to be comparable to current methods for making evaporated milk.

If the new process works out, it creates a new field for tinplate producers and the can companies.

Is Steel Technology Lagging?

Industry Gives Emphatic "No" to Kefauver Allegation

Chairman of Senate committee probing steel prices gives only one side of story.

Industry rebuttal points to American advances, problems in adopting new processes.

■ Sen. Estes Kefauver stirred up a hornet's nest when he charged that American steel technology was lagging behind that of Europe.

"I just don't believe it," snapped Arthur B. Homer, president and chief executive officer of Bethlehem Steel Corp.

Under the circumstances, industry reaction was more or less restrained. But the gist of comment was that the chairman of the senatorial committee investigating steel prices doesn't know what he's talking about.

Headline-Hunting — Washington observers feel that Sen. Kefauver is casting about for a few more headlines. His probe has not been getting the coverage from news-

papers and magazines that he had hoped for. His efforts to black-jack U. S. Steel Corp. and Bethlehem Steel on steel prices were largely a failure.

What Sen. Kefauver failed to mention were the many advances developed by U. S. mills over the years, particularly the continuous rolling of sheet and strip. He also neglected to explain the considerations that American mills must take into account before they make a decision to adopt a radical new process.

Continuous Casting Status—For example, continuous casting of steel is a promising development. But even its backers concede it has not yet demonstrated its soundness for volume operations. A large steel company seriously considered building a continuous casting plant in lieu of a new \$50 million blooming-slabbing mill. But after close study, the company reluctantly decided there were too many questions still to be answered.

The Koppers Co. is thinking mainly along the lines of faster casting as the answer to greater volume. Koppers feels it can turn out continuously cast steel slabs at the rate of 50 inches a minute. This compares with speeds of 10 inches a minute for European equipment.

Humphrey Next—This week, the Senate subcommittee was scheduled to question National Steel Corp. Former treasury secretary George Humphrey was scheduled to testify as board chairman of the firm.

Fred V. Gardner, Milwaukee management consultant, price analyst, president of the Smith Steel Foundry and director of several other firms, last week became the first witness apart from steel union leaders to criticize steel's pricing policies.

On Break-even Points — Mr. Gardner contended, by use of a statistical method of computing break-even points for the steel industry, that the 4 pct price boost this year was more than was justified by cost increases.

He said U. S. Steel's break-even point—the point where income equals fixed costs—averaged out at 44 pct of its sales from 1950 through 1955; dropped to 42.3 pct in 1956; dropped again to 38.7 pct in the first six months of this year. Based on last weeks' earnings statement of U. S. Steel, he said, the break-even point dipped to 36.6 pct of sales, or about 32 pct of capacity, in the third quarter of this year following the \$6-per-ton price increase. He said this is the lowest of any company.

Where Steel Ranks—For the steel industry as a whole, he said the break-even point now is a low 44.8 pct of sales, compared to the average of all industry of 49.8 pct.

Kefauver Demands Steel Price Cut

■ Declining scrap prices are Sen. Estes Kefauver's latest weapon in his efforts to bludgeon the steel industry into cutting its prices. He cites the sagging scrap market as one reason why steel prices should be rolled back "at least \$3 a ton."

Sen. Kefauver argues that only about half of the July 1 price hike was due to higher wage costs, and that this had already been partly offset by the decline in scrap prices. In view of the drop in steel production, he insists, present profits in steel would be impossible unless the July

increase was "substantially in excess of the wage increase."

The senator argues that a price cut would help the economy by helping steel users lower prices, sell more goods, and maintain purchasing power and employment. He did not explain how he arrived at the \$3 figure.

Steel companies have contended that last July's \$6-a-ton price boost was not enough to cover wage boosts and the resulting spiral in the cost of goods and services they buy.

Third Quarter Earnings Decline

But Most Nine-Month Totals Above '56

Customer buying resistance resulted in lower profits for many steelmakers in the third quarter.

With nine-month totals indicating '57 will be a good year, there's only guarded optimism about outlook for '58.

■ Third quarter earnings of most steel companies — reflecting continued buyer interest in liquidating inventories—dropped from second quarter levels. However, on the basis of strong nine-month earnings, in many cases setting records, 1957 will be a good year for the majority of steel producers.

When July-September earnings this year are compared with last year's they show a non-representative gain because the 1956 steel strike crippled third quarter steel operations.

Many Ahead — However, many companies including U. S. Steel, Bethlehem, Republic Steel, Inland, Jones & Laughlin, and Youngstown Sheet & Tube are running ahead of 1956 earnings at the three-quarter mark. Exceptions are Copperweld, Alan Wood, Wheeling, Detroit Steel, Sharon Steel, Granite City, and Continental—all reporting lower nine-month totals compared with '56.

Looking beyond 1957 there's only limited optimism among steel executives. Customer inventory policy is seen as the key to sales next year. Pointing out that user steel inventories climbed to about 10 million tons between the end of the steel strike in '56 and April or May of this year, U. S. Steel Chairman Roger M. Blough declares: "Since that time, inventories have steadily been reduced, and we expect that reduction to continue

for some time, I think it will probably continue into next year." Some industries now have very low inventories, Blough maintains, but felt others could still reduce stocks.

Basic Demand Remains — Declining to predict the economic outlook for '58, Arthur B. Homer, president and chief executive officer of Bethlehem Steel Corp. would only comment, "It looks to us as if there is a leveling off in business, and I don't see too much ahead in 1958 at the moment that would indicate very much of an increase or change in the situation."

After noting some of the factors that have slowed the business rate, C. M. White, chairman of Republic Steel Corp. adds, "Nothing that has occurred changes our basic belief that the country's needs — for

schools, roads, homes, automobiles, color television, and all the other things which promise a better life and which require steel—are going to continue to grow."

Conservatively Optimistic — Inventory reductions are also singled out by Allegheny Ludlum's President E. J. Hanley. "Operations in the third quarter," he notes, "reflected continued inventory liquidation by customers and cutbacks in demand for some products because of stretchout of defense contracts. While there has recently been improvement in automotive ordering, buying at this point in many lines is still slow."

"We are conservatively optimistic into the first quarter of 1958," says M. J. Zivian, President, Detroit Steel Corp.

Steel Earnings: 1957 Versus 1956

COMPANY	Third Quarter 1957	Third Quarter 1956	Pct Change
U. S. Steel	\$97,555,683	\$34,785,870	+180.4
Bethlehem Steel	40,051,465	4,428,143	+804.5
Republic	20,121,297	4,305,948	+367.3
Jones & Laughlin	11,377,000	1,360,000	+736.5
National	8,041,074	6,514,649	+ 23.4
Youngstown Sheet & Tube	9,890,247	3,381,881	+192.4
Inland	13,382,172	6,529,999	+104.9
Colorado Fuel & Iron	3,295,509	371,389	+787.3
Wheeling	1,714,000	525,000	+226.5
Sharon	213,852	301,507	- 29.1
Crucible	(225,119)*	510,226	-144.1
Pittsburgh	654,049	(348,190)*	+287.8
Granite City	1,622,303	3,798,746	- 57.3
Allegheny Ludlum	1,983,861	556,445	+ 25.6
Lukens	2,330,637	720,164	+ 22.4
Detroit	159,889	2,301,558	- 93.1
Alan Wood	(225,840)*	754,266	-129.9
Continental	530,475	609,370	- 12.9
Acme	1,447,145	885,163	+ 63.5
Armco	14,293,811	9,106,907	+ 56.9
McLouth	2,166,371	1,315,910	+ 64.6
Copperweld	87,202	621,707	- 85.9

* Indicates net loss.

How to Cut Your Accident Rate

There's an Answer to Every Safety Problem

Industrial accidents are off from peak of 1951. But costs are up.

Case histories show how companies have solved hazardous situations.—By K. W. Bennett.

■ Industrial accidents cost the lives of 14,300 persons last year. The total cost of work injuries amounted to \$1.9 billion. There were 2,000,000 injuries on the job. Wages lost amounted to \$1.1 billion. The totals represent a 1-3 pct gain over 1955.

The figures do not include legal costs, payments in damage suits, losses in plant efficiency. Industrial accidents are taking bigger bites out of the manufacturing dollar.

Paradoxically, the number of accidents in industry has been reduced well below the peak figure of 1951. But cost per accident per worker has gone up. Total accident costs are running about 18 pct greater this year than they were in 1951.

National Safety Congress dele-

gates, meeting in Chicago, hit the accident problem hard. They came up with some practical answers to dangerous problems. Here are some of them:

The problem: A 600-man machine shop requires 100 pct use of safety goggles. Violators of the rule are invariably "outsiders" from other departments. The solution: A "traffic ticket" to workers spotted without safety goggles. The ticket is in three copies. The violator gets one ordering him to appear at the next eye safety lecture. His supervisor gets one copy, the plant safety director files the third. Repeated violations lead to stronger corrective measures.

The problem: Stock chasers and truck men were climbing stacks of paper boxes to check contents of the top box. They refused to carry ladders. One violator fell, broke both heels, and demanded damages. The solution: A truck mirror mounted on an L-shaped piece of light tubing. Stock room men carry

them or put one at the end of each bay. Lift truck operators carry one on their trucks. It works like the old hotel detective trick of a mirror mounted on a broom for over-the-transom observations. Now the machine shop want similar equipment for peering under low-bodied machine tools for lost parts.

The problem: Incidence of accidents in handling unfamiliar chemicals began to rise. Solution: A "chemical use committee" was formed. When any plant department requested purchase of an unfamiliar chemical solution, the request was reviewed by the committee, consisting of the plant superintendent, the plant safety man, and the plant fire protection officer. If use was okayed, the purchasing department told suppliers that purchase was contingent on their supplying descriptions of the chemical and any possible injurious effects. These descriptions were also reviewed by the chemical committee.

The problem: Workers in a metal routing shop wanted to wear gloves to protect their hands from hot metal chips, despite the dangers of the gloves becoming entangled in moving tool parts and causing hand injuries. The solution: A light neoprene glove that gave some heat protection, yet would strip off easily if caught in a machine part.

The problem: Overall accident incidence rose by a staggering 160 pct. A consultant doing motion-time study work suggested dividing the plant's 300-man work force into teams. Each team gets a given number of points at the beginning of each month. Points are deducted for each injury. Members of the winning team draw for credit at a local department store at the end of each month. Accidents dropped



Accident Costs Keep Climbing

Year	Accident Cost Per Worker	Man-Day Loss	Total Work Injuries
1950	\$40	275 million	1.95 million
1951	40	285	2.1
1952	45	250	2.0
1953	50	250	2.0
1954	50	230	1.85
1955	50	235	1.9
1956	55	235	2.0

sharply. The plan has been so effective, the National Safety Council plans to publish a detailed paper on the complete system.

The problem: A farm equipment manufacturer found 37 pct of accidents were due to workers' failure to wear safety shoes. He set up a contest, with weekly baseball tickets awarded to the team in which 90 pct of the group wore safety shoes during the one-week period. Foot accidents dropped from a high of over 10 per day to zero.

The problem: Industrial furnace explosions were increasing in a large automotive plant. One of the reasons was a major expansion in furnace capacity. New and inexperienced furnace operators were doing a slipshod job on furnace safety. One typical case was opening of rear and feed doors of an explosive-atmosphere furnace during shutdown. Air was carried into the gas atmosphere and an explosive mixture resulted. Furnaces were equipped with door inter-locks, which permit only one door to be opened at a time. At the same time, furnaces were equipped with automatic shut-offs.

The problem: The firm was blanketing its walls with safety slogans, but nobody seemed to be reading them. Solution: The safety director set up a telephone quiz. Each week he called the wives of workers. If the Missus could tell him what safety slogan the plant was using that week, as passed along to her by her good husband, she and her helpmate received \$5. The contest lasted three months. The old man didn't dare go home without the safety slogan for the week.

Railroad Car Repairs

A new maintenance and car repair shop at Baton Rouge, La., will cost Union Tank Car Co. about \$1 million.

Preliminary construction work has begun, with completion scheduled for first half of 1958.

Humphrey Returns To Business Wars

After battle of Washington, new National Steel Chairman is glad to be back in business.

He forecasts good year for 1958 on completion of company's expansion program.

■ "It feels just wonderful to be back in business," said George M. Humphrey, new board chairman of National Steel Corp., in his first press conference since leaving his post as Secretary of the Treasury.

"I wouldn't take a thing for the 4½ years' experience I had in Washington, but I'm glad it's over. As far as I'm concerned there isn't any work in business."

\$500 Million Program—The man who helped organize National Steel in 1929 was speaking last week at Great Lakes Steel, Detroit unit of the corporation. The occasion marked completion of a six-year expansion program which cost nearly \$500 million.

The program covered expansion, replacement and modernization in all phases of steelmaking, included construction of a new blast furnace at Great Lakes with a hearth diameter of 30 ft 3 in. and a height of 110 ft. This makes it the largest in the world.

Business Outlook—On the prospects for the industry in 1958, Mr. Humphrey said, "I think they're fairly good," and turned to Thomas E. Millsop, chief executive officer of National Steel.

Mr. Millsop spoke of the constant rise in the industry's capacity. He observed that Nation's capacity had gone from five to seven million ingot tons during the past six years. "I would estimate that the industry's capacity today is about 138 million tons, or some five million tons above what it was at the beginning of this



National Steel's Humphrey

year. Sometime in 1958 it will probably reach 143 million tons."

"We estimate 1957 steel production at about the same as it was last year, give or take a million tons, and right now it looks as though the estimate should be on the low side. In 1958, production should be about the same as 1957; say about 115 million ingot tons," Mr. Millsop predicted.

No Change in Products—Mr. Humphrey scotched rumors that National Steel would diversify by getting into other lines. And, he said, "We have no present plans for any change in our product mix."

Asked whether he had changed his mind on fast tax write-offs since he was now on the other side of the fence, he said, "I'm the guy that stopped them and I haven't changed my mind. They're unfair except in an emergency unless they apply equally to all—including the supermarket across the street from the mill." (The IRON AGE, April 18, 1957.)



AT THE SHOW: Technicians from Atomic Power Equipment Dept., General Electric, heat nuclear fuel elements.

Atomic Energy Problems Mount

Reactor builders rack up heavy losses as costs skyrocket, problems mount.

Pessimism may bring use of sharper pencils and engineering changes.

■ The glowing optimism that has mesmerized a large section of the atomic energy industry over the past few years has given way to a skeptical pessimism. Skyrocketing reactor costs arising from a host of causes have brought an agonizing reappraisal of the profit outlook for the big old-line companies in the field. This development may discourage some of the newer firms.

Industry leaders in New York last week for the fourth annual meeting and trade show of Atomic Industrial Forum generally agreed that the new pessimism may be a good thing.

It was conceded that most, if not all, of the power plants built or building have been taken at a loss.

Problems Ahead—A look at

some of the engineering problems associated with reactors shows the size of the job ahead. There are others, including high cost of uranium, security clearances, inability to get patent protection, the fact that competitive fission power in the U. S. is still 10 to 15 years away, and the possibility that fusion power could come along during that period.

Fuel element design is a problem cited by Lee Devanport, president of Sylvania-Corning Nuclear Corp. The widely-copied Materials Testing Reactor elements have dissimilar end fittings, which adds some 20 pct to the cost. Its "plates" are essentially sheet metal products, yet they are specified like precision machine work. Perhaps 0.010 in. would be satisfactory, but the engineer says, "Why take a chance?" So he writes, "0.001 in."

Core Factors—Pressure vessels are a tough problem. The reactor core requires the greatest design time, is the last item to be installed in the reactor. Design of the core

affects design of the pressure vessel that surrounds it in a pressurized water reactor. Yet fabrication of the reactor vessel must start from two and one-half to three years before the core is installed.

More Headaches—Consider the design problem in a 9-ft diam closure for an 1800 psi vessel. Metal section must be 14 to 15 in. thick. If a sudden temperature change of 50°F occurs on one surface of this heavy section, it will be some 23 minutes before any temperature change can be detected on the opposite surface. Naturally, this causes thermal stress and distortion—raising a bit of a problem because the seal must not leak more than one-millionth of a cc per hr.

Valves design has caused normally stormy Admiral Rickover to fly into a tempest. The problem was outlined by H. J. Cooper, Cooper Alloy Corp., specialists in stainless steel valve bodies. It can be solved, he pointed out, by viewing it as an engineering problem, not as a mysterious art.

Man-Made Diamonds Hit Market

But Will High Cost and Small Size Limit Their Use?

Industrial diamond industry says GE synthetics will open new markets for bort.

GE hopes to supply half of industry's needs for fine-mesh material.

■ Commercial production of synthetic diamonds is underway at General Electric Co.'s Metallurgical Products Dept. in Detroit. Well over 100,000 carats already have been made, GE officials report, and the company plans to supply nearly half U. S. industry's industrial diamond needs within the near future.

By emerging from the laboratory stage in little more than two years time, the project has achieved "something of a world's record," says Dr. Guy Suits, GE vice president and director of research.

Tool Bit Potential—Aside from conventional uses in abrasives, grinding wheels, and lapping compounds, speculation points to synthetic diamond use as cutting tool bits. Such bits would make possible working the harder materials needed for high temperature conditions encountered in missile development.

But much larger diamonds would be needed for tool bits than the 60 to 400 mesh size (like coarse to fine sand) now being made. GE researchers are working on this problem. Another immediate goal is to bring down the cost of synthetic diamonds, which at present is about 40 pct above that of natural diamonds.

Trade Reaction—However, another industrial diamond source claims that GE's announcement has been widely misinterpreted. Margaret McGinnis, executive manager, Industrial Diamond Assn. of America, stresses that GE's current

production is limited to the equivalent of crushing bort.

The price is still above the natural product, IDAA says, and GE is still not sure it can synthesize large diamonds. Traders believe it will be some time before larger size synthetic stones—suitable for drills, tools, or wire drawing dies—are available at any price.

Room for Both—Actually, the diamond trade would welcome additional bort regardless of source. Many large potential uses have not been investigated because of lack of assurance that supplies of bort would be available on a continuing basis.

Synthetics, if available at a competitive price, could prove a valuable stimulus to further uses of both natural and man-made diamonds. Even with GE's production, demand in 1958 will still exceed supply, IDAA points out.

Research Frontier Opens—Tests reveal no difference in performance between the two types, GE reports. Methods GE uses in making the synthetic product are similar to the natural process except conditions are more closely controlled.

The development is strictly one of private enterprise, financed by the company all the way, company officials say. Cost so far is \$2.5 million.

A long-range result of the project, Dr. Suits points out, is opening the new pressure-temperature frontier for further scientific exploration. This superpressure research has implications far beyond the production of diamonds, he says, adding:

"It will give us new insight into many new properties of materials—not only hardness but also strength, ductility, conductivity, and magnetic properties."



THEY'RE REAL: Research scientists at GE's Metallurgical Products Dept., Detroit, take a close look at a batch of synthetic diamonds. Engineers in background regulate equipment used in making the diamonds.

Another Aluminum Bid For Cans

Kaiser calls its new deep draw method key to aluminum's future for food cans.

Aluminum still costs more, but other advantages are expected to make up the difference.

■ Kaiser Aluminum figures it has what it takes to make the aluminum can for food a commercial success:

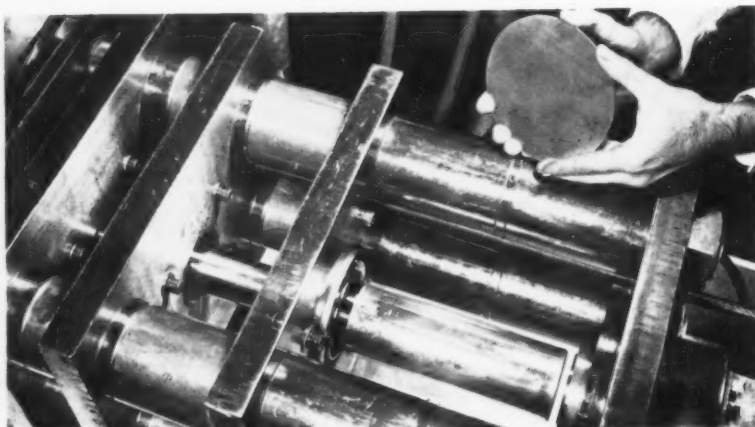
1) A deep drawing method which can produce a can three times as deep as its diameter, in one stroke.

2) A contract for 5.5 million cans for Kraft Foods.

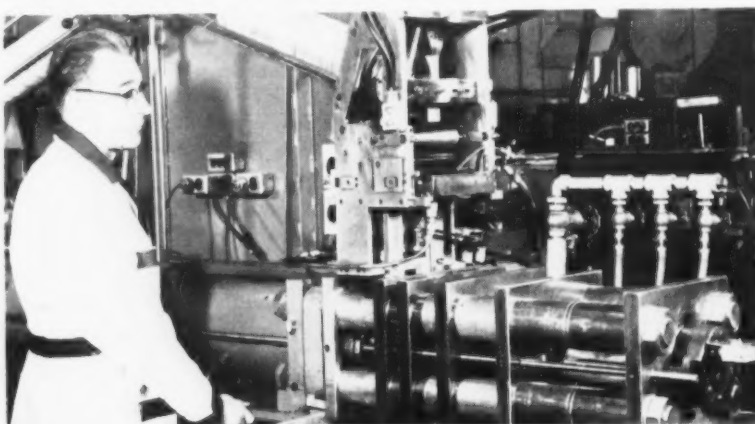
The company announced it will begin filling the contract on facilities recently installed at its Wanatah, Ind., plant (The IRON AGE, May 2, p. 62).

For All to Use—Kaiser will make its process available to canmakers, says the techniques will open the door to a market which may be one of aluminum's biggest.

Kaiser concedes initial cost is higher than tinplate, but expects lightweight, adaptability to special shapes, and appearance, to make up the difference. And the equipment takes up less space than tinplate can machinery, says Kaiser.



TAKE ONE: Press forms aluminum can bodies by drawing disks through cupping, ironing, and bottoming dies, automatically, in one stroke.



FINAL STAGES: After the aluminum disk has been forced through a series of dies by a punch it need only be trimmed and flanged.



TOOLING: New Kaiser deep draw technique requires less tooling (in hand) than for conventional drawing (on table) for the same end results.



QUICK: Kaiser canmaking involves only four basic steps: Drawing to form can body, trimming and flanging, stamping the top, and sealing when full.

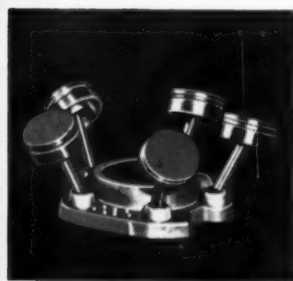
How
DENISON
MULTIPRESS
 speeds
MASS
ASSEMBLIES

Turns out 400
 precision piston rod
 assemblies a day with
DENISON MULTIPRESS

EACH air-conditioning system produced by this leading manufacturer for passenger car use requires a compact 5-cylinder compressor assembly whose piston rods are actuated by a wobble plate.

To complete this assembly, a ground ball at the end of each rod is locked into a socket joint in the plate. With a single swift ram stroke, the Multipress forms the socket over the ball. Each socket joint is held to uniform tolerances . . . to be tight, but not bind. Scrap is nil.

Whatever your job—a Denison hydraulic specialist can show you how to speed your production and cut costs. Write us, Denison Engineering Division, American Brake Shoe Co., 1242 Dublin Road, Columbus 16, Ohio.



400 COMPLETE ASSEMBLIES A DAY
 with Denison 8-ton hydraulic Multipress. Each assembly requires 5 separate forming operations—locking 5 piston rods to wobble plate.

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HYDRAULIC PRESSES • PUMPS • MOTORS • CONTROLS





Arthur B. Homer
Shipbuilder Takes Over the Helm



Eugene G. Grace
More Than Half-Century of Service

Grace Steps Down, Homer Succeeds

Steel industry's "elder statesman" retires after over forty years of directing Bethlehem Steel Corp.

Arthur B. Homer, company president for the past 12 years, becomes new chief executive.

■ Eugene G. Grace—the colorful and outspoken "elder statesman" of the steel industry—has retired as chairman and chief executive officer of Bethlehem Steel Corp.

Replacing him as the firm's chief executive officer is Arthur B. Homer, Bethlehem's president for the past 12 years. The position of board chairman has been abolished.

Stays A Director—Mr. Grace, who has been named honorary chairman by the directors, will remain with the company as a director and take part in its management. A leader in the steel business for more than 50 years, he joined Bethlehem in 1899 after graduating from Lehigh. Appointed general manager in 1908, he was named president of Bethlehem Steel Co. in 1913 when only 36. He became chairman of the corporation in 1945.

During the years he directed Bethlehem the company rose to its position as the second largest steel producer in the world with a present ingot capacity of 20.5 million tons.

Shipbuilding Experience—Arthur Homer, who succeeds him as chief executive officer, has spent all his working life with Bethlehem, as has Grace. He joined the firm in 1919 as assistant to the general superintendent of the Quincy, Mass., shipyard. Two years later he went to Bethlehem as manager of the diesel engineering and sales division.

He designed one of the first gas-turbine engines and became interested in the metallurgy of high-temperature steel. Mr. Homer was transferred to Elizabeth, N. J., in 1925, where he supervised the design and production of small diesel engines.

In 1940, following service in various production, engineering and sales positions, he was named vice president in charge of Bethlehem's shipbuilding division. During World War II he was responsible for expansion and operation of the company's 15 shipyards, which turned out more than 1100 vessels.

Ask Legislation For Plant Security

A growing sentiment among production executives is that a suspected subversive has no right in defense industry, even in a non-critical job.

That feeling was voiced at the recent seminar in Washington of the American Society for Industrial Security (ASIS) by Leston Faneuf, president, Bell Aircraft Corp.

Mr. Faneuf urged congressional action to produce a truly effective plant security law. His views are similar to those of the Defense Dept., which would like the legal means to have risky personnel barred from any and all jobs in plants handling military contracts.

In too many instances, Mr. Faneuf said, top management believes that because employees wear identification badges and don't broadcast military secrets the functions of industrial security are met.

Government Role in Security—Industry can't, and isn't expected to, handle the security task alone, according to Rear Adm. W. A. Schoech, USN. Adm. Schoech, deputy chief of the Bureau of Aeronautics, noted that the military and industry must work as partners in the program. The former, he said, must take time to discuss its security goals with manufacturers.

A special difficulty in dealing with any project connected with the military is that of overclassification, Adm. Schoech warned. Only three types of basic information on aircraft or missile projects administered by the Bureau of Aeronautics must be safeguarded, he said, performance, design features, and production quantities or methods.

Costly Problem—Security problems connected with the defense effort are a \$30-million-a-year expense item for the military, Stephen S. Jackson told the ASIS. Mr. Jackson, Deputy Assistant Secretary of Defense (Manpower), said Defense Dept. agencies conducted some 700,000 investigations for clearances in 1956.

How Rollpin cuts assembly costs

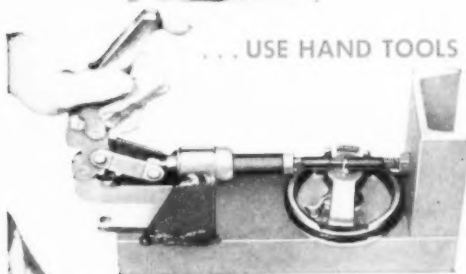
by matching the insertion method to the assembly problem



HAMMER IT IN . . .



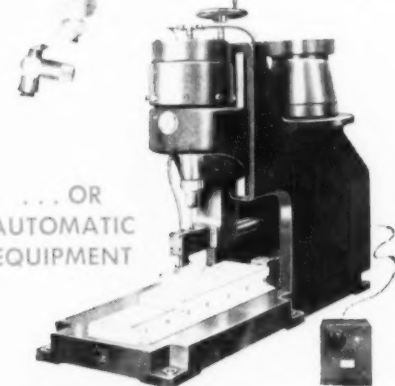
... USE HAND TOOLS



... POWER TOOLS



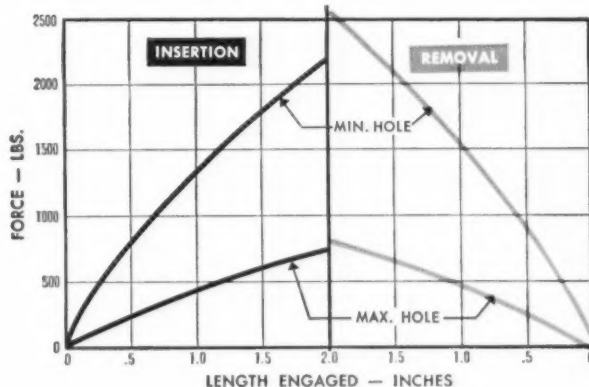
... OR
AUTOMATIC
EQUIPMENT



It's as easy to insert a Rollpin[®] as it looks. And it's fast any way you do it. You can use a hammer, hand tool, power tool or automatic equipment. Insertion cost is less because no precision drilling or reaming or secondary locking operations are required. A hole drilled to normal production standards will do.

Rollpin is a slotted, chamfered, cylindrical spring pin. It locks securely in place—and can be drifted out and reused over and over again. Rollpin replaces taper pins, straight pins and set screws; for many applications it will serve as a rivet, dowel, hinge pin, cotter pin or stop pin.

TYPICAL INSERTION AND REMOVAL FORCES IN STEEL
FOR .250" DIAMETER ROLLPIN



WHY ROLLPIN IS SELF-LOCKING. Here is graphic evidence of the forces that make Rollpin a truly self-locking spring type fastener that will remain tight under vibration until deliberately removed.

ELASTIC STOP NUT CORPORATION OF AMERICA

Dept. R45-1177, 2330 Vauxhall Road, Union, New Jersey

Please send me the following:

- ☐ Rollpin installation data ☐ Here is a drawing of our fastening problem. What insertion method would you suggest?

Name _____ Title _____

Firm _____

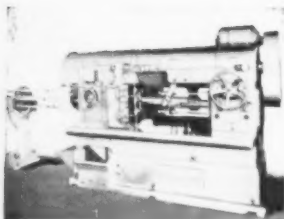
Street _____

City _____ Zone _____ State _____

If you haven't read this important booklet, your production line may be operating at less than peak efficiency. Your operations may be beating competition with HSS today, but you will likely need carbide tooling to be the leader tomorrow.



Write for your free copy of this important booklet today!



Conomatic

CONE AUTOMATIC MACHINE COMPANY, INC., WINDSOR, VT., U. S. A.

Harrison C. Bristoll

He Packs Up Shipping Troubles

Use of flat steel strapping for material handling has come a long way in three decades.

Here is a man who helped raise it from its former limited role in the shipping room.

■ Harrison C. Bristoll, vice president of The Stanley Works and general manager of Stanley Steel Strapping Div., is forever searching for packages that can economically and speedily be bound with steel bands.

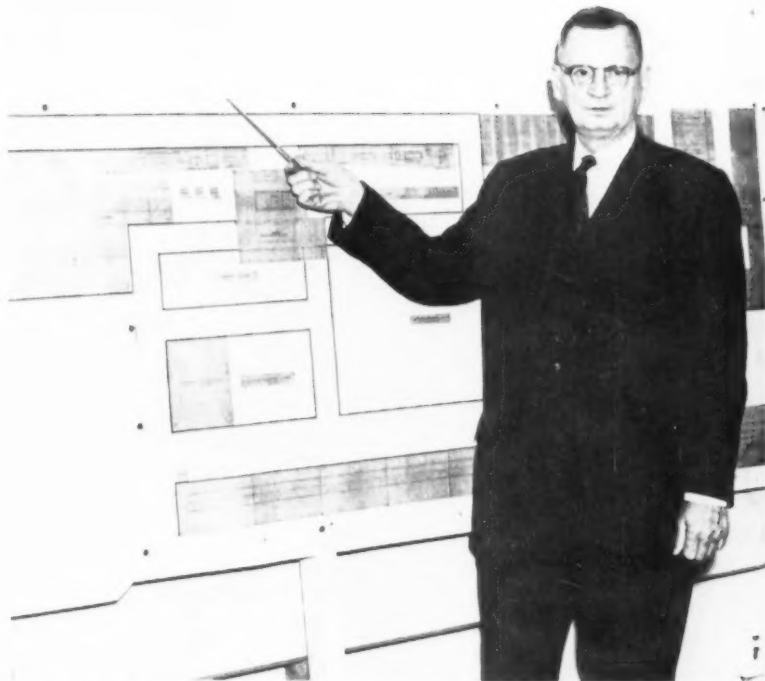
Steel strapping, he contends, has probably contributed more than any one product to improvements in shipping and material handling.

Small Start—When Mr. Bristoll joined Stanley 31 years ago as assistant sales manager, steel strapping was used almost exclusively as a reinforcement for wooden boxes and crates. He had under his wing only three full time salesmen and a few part-time agents. Most of the selling was done by mail. Included in the company's line was one steel strapping tool which only the designer could make work.

It took a while, but the industry gradually got its message across: You can produce the best product in the world, but if it gets damaged en route to its destination, all your work has gone for nothing. And if you waste money on unnecessarily elaborate shipping packages, your margin of profit will suffer correspondingly.

Gets Results—With these basic tenets in mind, Mr. Bristoll set out to find quick ways to wrap up industry's products without sacrificing safety and economy. His record of "service to shippers" speaks for itself.

He has done much through his



H. C. BRISTOLL: Close industry cooperation made the difference.

salesmen and field engineers to bring about the wide use of electrically, powered strapping tools. He has also figured in the development of portable air tools and automatic and semi-automatic production line strapping machines.

Cites Industry Cooperation—But these advances, he points out, were made possible only by the close cooperation of the steel strapping companies with shippers, carriers, and manufacturers of containers and material handling equipment. They've led to the skidding and palletizing of castings, pigs of metal, and countless other uses. Such engineering service in the past three decades has brought about millions of dol-

lars in shipping savings for many industries.

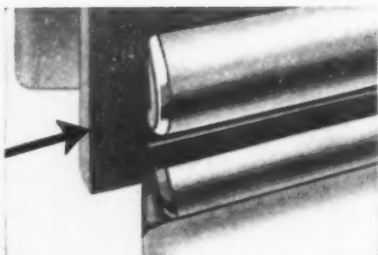
Heads Up Expansion — Four years after he joined Stanley, Mr. Bristoll was named sales manager. In 1947, he was also put in charge of steel strapping production. When he was elected division general manager and vice president, he immediately replaced outmoded production equipment with new machines.

Now The Stanley Works is expanding its steel rolling capacity and investing about \$2½ million in a new strapping plant. Like Harrison Bristoll figured in 1926, wrapping industry's products in bands of steel still has a promising future.

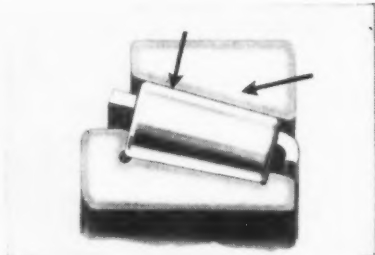
Get all these advantages . . . specify **TIMKEN** tapered roller bearings



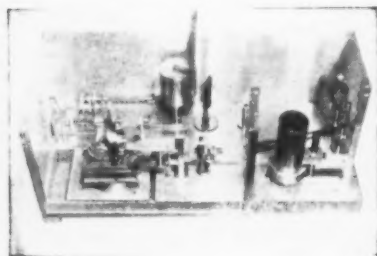
THERE ARE 27 TYPES of Timken tapered roller bearings. This wide selection means you get the bearing design exactly suited to your job. Whatever your bearing application problem, we can help solve it.



THE SOFT STEEL CAGE used in Timken tapered roller bearings separates the rollers, keeping them spaced evenly. This prevents scuffing of the rollers, adds to the bearing life and gives you more for your money.



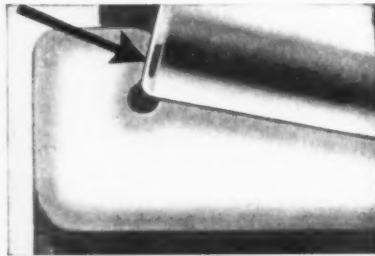
HARD ON THE OUTSIDE, tough on the inside. To take shock loads, give longer life, Timken bearing rollers and races are case-carburized to have a hard, wear-resistant surface over a tough, shock-resistant core.



MICRO-INCH FINISH is standard for Timken bearings. This profilograph checks contours and smoothness of circular surfaces to a millionth of an inch, helps us make Timken bearings truer, quieter, longer-wearing.



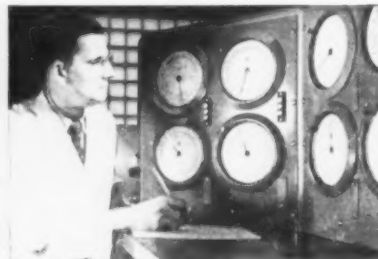
6,525 SIZES, the world's largest selection of tapered roller bearings. From bearings smaller than your finger to 71½" in inside diameter, the Timken Company can supply the size you need for any specific application.



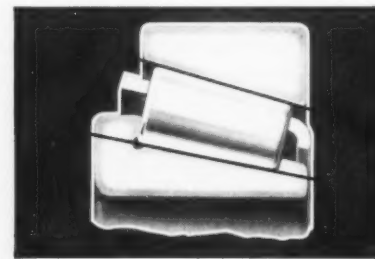
POSITIVE ROLLER ALIGNMENT is assured because the taper in Timken bearings holds ends of rollers snug against the rib. The taper in Timken bearings lets them take radial or thrust loads or any combination.



ACCURATE TO 50 MILLIONTHS of an inch. This Universal Measuring Machine checks gages and machine parts used to make Timken bearings. Our gage laboratory, one of the world's best equipped, helps make Timken tapered roller bearings your No. 1 bearing value.



ONLY FINEST ALLOY STEEL is used in Timken bearings. This spectrometer helps control its quality—in 40 seconds gives the exact chemical analysis of a melt. In a few minutes, results are flashed to the melter. It's another step in rigid quality control.



FULL LINE OF CONTACT between Timken bearings' rollers and races gives them *extra* load-carrying capacity. To get *all* these advantages, specify "Timken". The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

TIMKEN

TAPERED ROLLER BEARINGS ROLL THE LOAD

See the next Timken Televent hour, "The Innocent Years" over NBC-TV, Thursday night, November 21st.

Consumer Spending: Key to 1958

Underlying even the possible end of the capital goods boom is failure of consumer demand to meet expectations.

It's too early to tell, but some signs point to heavier buying of durables ahead.

■ Most predictions of a gradual business decline in 1958 are based on the assumption that the capital goods boom is on the wane. That's correct, as far as it goes.

Business is not scheduling significant new expansion programs. Many are being stretched out. A few are quietly cancelled. As a result, makers of heavy manufacturing equipment are feeling the pinch. Even those with long backlogs are watching them dwindle, without any new flow of orders.

Consumer Disappointments—But the real reason business is worried is that consumer spending for major items has not kept pace with expectations. Most expansion programs were based on the rate of demand of 1955, perhaps with allowances for increases in demand each year throughout the late 50's. Obviously, this has not materialized.

Most indexes show that consumer spending for new cars, appliances, home furnishings and other major items has been relatively steady since early 1956, but at a rate considerably lower than 1955.

Not Good Enough—By any other standards, the past year-and-a-half would have been relatively satisfactory for most makers of consumer durables. But with productive capacity and executive forecasts geared to

1955 and better levels, it has raised more than a few questions.

Manufacturers of basic metals are now finding themselves in the same situation the auto and appliance industries found themselves in a year ago—with business good, but not good enough.

Watch the Index—The alert businessman will pay more attention to consumer spending than he did a

year or two ago. If business is to maintain its current high level, even allowing for a slight decline, consumer spending will have to take a different turn.

That is why you will find more interest than usual in the introduction of the new cars this fall. The smart executive is not looking them over with an eye to what he will buy, but how well he thinks they will go over with the public in general.

A Comeback May Be in Sight

Comeback in Sight? — You will get a lot of argument from this, but there are evidences that the consumer may return to market this winter for more of the heavy durables than has been the case recently.

For one thing, the consumer does have the money. Personal income in the third quarter reached an annual rate of \$346.5 billion, seasonally adjusted. This is about \$4 billion higher than the third quarter and 18 billion over the third quarter of 1956.

Except in a few scattered areas (for example, the highly publicized aircraft layoffs), employment remains at an all-time high. Farm income holds steady, although largely because of increased government payments.

Furthermore, there may be some easing in tight money. Banking people insist there is still strong competition for available credit, which in itself is a good sign, but any easing should have a stimulating effect on business.

How Tech Personnel Rate in Pay

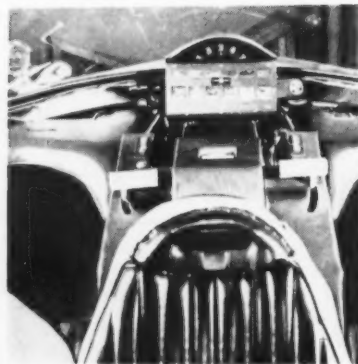
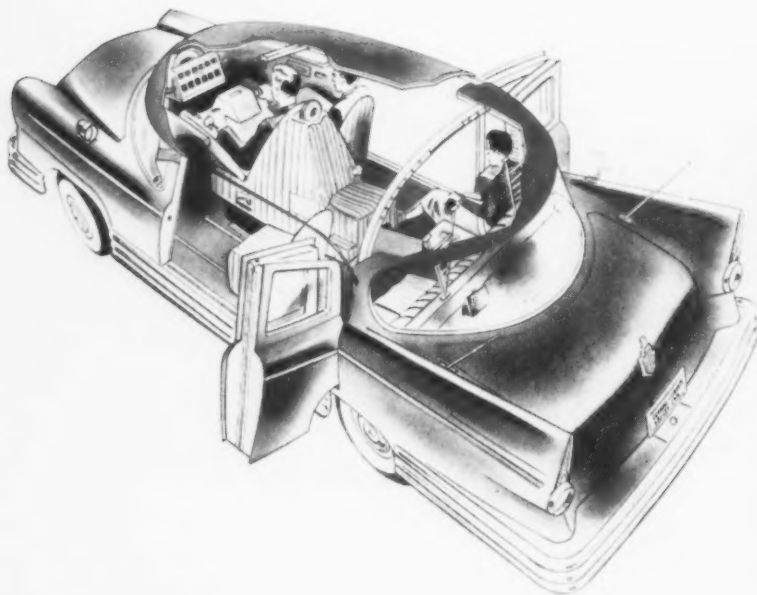
Pay Rates — One of the most ticklish problems in personnel is establishing pay rates for your technical people. No doubt your company has lost good men to the competition, and wondered how much salary had to do with it.

A new survey by the American Management Assn. shows that salary of engineering, scientific and administrative employees rose 5.9 pct between June, 1956 and June, 1957.

Who Got Raised — Maximum gain was made by quality control engineers, who received an average of 7.9 pct salary increase.

Median salaries paid to engineers in all fields range from \$5400 in the lowest or entering category to \$13,100 for the highest nonmanagement level. Individual salaries went as high as \$20,000.

Median salaries of administrative employees fall between \$5100 and \$10,000.



MAXIMUM PROTECTION: Arrangement of seats, shown in sketch, plus safety belts make it difficult for passengers in the Cornell-Liberty safety car to be hurt by striking anything in the interior of the car. Photo of driver's seat (above) shows steering levers in place of a wheel

Will Detroit Buy a Safety Car?

After years of study, Cornell Aero. Lab and Liberty Mutual Insurance Co. put their ideas into a mock-up auto.

It could change design concepts for automobiles of the future.—By H. R. Neal.

■ Packaging automobile riders like eggs in a crate may not sound like the best way to go about designing a passenger vehicle—but it might be the safest.

To prove the point, a theoretically "injury-proof" car has been designed along just such principles. It is claimed to be "the world's first automobile to be built with the safety of the occupants as the sole designing objective." Supposedly, riders could escape harm-free in a 50 mph head-on collision.

Years of Study—Prospective car buyers should be cautioned not to put off any purchases they have in

mind in hopes the "safety" car will appear soon. This car is only a non-operational experimental vehicle at present. While Detroit has found the vehicle interesting, it isn't about to buy the whole package at the first crack of publicity.

The research vehicle is the culmination of a 5-year research program sponsored by the Liberty Mutual Insurance Co. and carried out by the Safety Design Research Department of the Cornell Aeronautical Laboratory, Inc. It is said to represent a composite of the safety features devised by Cornell during a 15-year study of aircraft and automobile accidents.

A Transformed Ford—Outwardly the car resembles one of Detroit's conventional products. It should. Basically, the car is a reworked 1956 Ford. It has a Chevrolet grille, Chrysler's fins. Here, for all practical purposes, the similarity ends.

The car body has been strengthened. Doors are designed so crash forces can't open them. Passengers are secured inside with seat belts or other devices. "Potentially lethal" objects or controls have been redesigned or eliminated.

Lever Steering—Most radical innovation has been the elimination of the steering wheel in favor of a lever-controlled hydraulic system, and the relocation of the driver's seat in the center of the car.

All seats are bucket type to provide lateral restraint, reduce riding fatigue and afford stronger mooring for seat belts. Telephone booth type doors are unique. Each door consists of two sections, hinged at the center and to the rear body post. The lower edge is supported by rollers on a track.

Detroit's Reaction—Roll-over bars, one front and one rear, give added support to the top. All-



COARSE THREADS LEAD TO LOWER ASSEMBLY COSTS

- Fasteners with coarse threads assemble faster, easier
- Make a stronger joint, too

Big savings hide in small details . . . in the threads of bolts, nuts and cap screws, for example.

Coarse threaded fasteners tighten with only two-thirds the revolutions needed for fine threads . . . speeding assembly. Coarse threads enter nuts or mating holes with less tendency to cross thread when not truly positioned. Often this ease of starting is a decisive production advantage. Even in *handling*, there's an advantage. Coarse threads need less "babying" to avoid damage.

• **More strength.** With greater resistance to stripping, coarse threaded fasteners can be tightened more for a stronger assembly.

Yes, even with standard fasteners there are ways to save money and improve quality . . . by looking at your products through the eyes of an RB&W Fastener Man. His service is available just for the asking. Russell, Burdsall & Ward Bolt and Nut Company, Port Chester, New York.



Plants at: Port Chester, N. Y.; Coraopolis, Pa.; Rock Falls, Ill.; Los Angeles, Calif. **Additional sales offices at:** Ardmore (Phila.), Pa.; Pittsburgh; Detroit; Chicago; Dallas; San Francisco. **Sales agents at:** Milwaukee; New Orleans; Denver; Fargo. **Distributors from coast to coast.**



Spin-Lock Nuts dig in to stay tight

The photograph shows the many hardened "anchors" on the flange of a Spin-Lock Nut. These "ratchet-action" teeth require 20% more torque to loosen than to tighten. They bite in as the nut turns down on its seat. Like Spin-Lock Screws, these nuts can stay put in products subject to vibration and cyclic temperature variations. Send for bulletin.

High strength bolts save costly crane



At one company's plant, a large, heavy-duty crane had deteriorated due to rivets loosening. Replacing with new rivets was no permanent answer, but RB&W high tensile bolts were.

Used with hardened washers, these RB&W bolts clamp members together so tightly, no slipping into bearing takes place, holes are reinforced against fatigue, and connections become vibration-proof.

Assembling heavy duty equipment with RB&W high strength bolts in the first place can avoid such problems and create more satisfaction with the product.

RB&W FASTENERS—STRONG POINT OF ANY ASSEMBLY



Aluminum swamp buggies skim over wet grass even faster than over water!

Sail over swamps at highway speeds!

Made of light, tough aluminum, these broad, flat bottomed boats are used daily—by rangers, engineers, sportsmen—to penetrate “unpenetrable swamps.”

Aluminum's ability to do things better than they were ever done before has made it the world's fastest growing metal.

Fortunately—in neighboring Canada there is abundant water power to produce the enormous amounts of electric-

ity needed to smelt aluminum. There, Aluminium Limited, an independent Canadian company, has developed two of the world's great hydroelectric systems in British Columbia and on the Saguenay and Peribonka Rivers in Quebec to power its vast aluminum smelters.

A substantial proportion of this aluminum from Canada will be shipped to the United States in the form of ingot.

For Aluminium Limited sells no end products in the U. S. It concentrates, instead, on supplying hundreds of U. S. fabricators with the metal that's increasingly important to U. S. business . . . vital to U. S. defense.

Aluminium Limited, Montreal: Canada's independent producer of aluminum ingot for U. S. industries.



Aluminum from Canada

The aluminum story
that's told 4,018,882 times

Over four million copies of *Time*, *Newsweek* and *U.S. News and World Report* carry this story of aluminum's amazing versatility. Regular nation-wide advertisements like this are helping to make the United States still more aluminum-conscious . . . helping you to build greater sales of your aluminum products.

Aluminium Limited Sales, Inc.

630 Fifth Avenue, New York 20, N. Y., Cleveland, Chicago, Los Angeles, Detroit, Atlanta, Buenos Aires, São Paulo

Automotive Production

WEEK ENDING	CARS	TRUCKS
Nov. 3 1957*	127,991	21,811
Oct. 26 1957	104,987	21,543
Nov. 2 1956	117,583	18,837
Oct. 27 1956	104,269	21,698
TO DATE 1957	5,035,774	909,048
TO DATE 1956	4,668,962	939,253

*Preliminary

Source: Ward's Reports

around bumpers, backed by 3/8-in. structural steel plus energy absorbing cellular plastic material, are rigidly attached to the frame.

Detroit has found the car interesting—with reservations. Engineers attending a meeting of the American Society of Body Engineers in Detroit were asked their reaction to the car.

But Will It Sell?—From the data available to them, they concluded the car could be built without too much difficulty. However, all engineers polled expressed doubt as to public acceptance. For some reason, they pointed out, safety is not something high on the list of musts for the average car buyer when he sets out to shop for a car.

When asked of the manufacturing possibilities for the car an Edsel engineer remarked: "Just about anything can be built—given time and money, but it's a question of public acceptance."

The Shortcomings—A Chrysler engineer conceded it had many theoretically desirable features and didn't seem to present any extraordinary manufacturing problems—just higher cost. But he didn't feel all of the features of the Cornell vehicle would work out in practice.

A General Motors engineer noted the telephone booth door construction and doubted some of its merits. For one thing, he said, sealing and rattles would be a problem. Another is the open track guiding the lower edge of the door. In winter, snow and ice could jam the track. And then there is the question of strength. Because of its design, he said, a stub-pillar hardtop model of today would give much greater pro-

tection in cases where the car is hit from the side.

Experts Are Silent—Several other features were frequently questioned. Such as: What are the added dangers of collision when attempting to pass a truck on a two or three lane highway, as the centrally located driver can't see as far to the left? Also, what happens to the steering when the hydraulic pump fails? This latter, at least, was belatedly recognized by the Cornell designers as a danger. Now, it is planned the generator would act as a pump motor if the regular pump drive should fail.

Except for the Ford Motor Co., safety experts with the auto companies preferred not to comment on the Cornell car—at least not on the record.

Platt's Opinion—F. M. Platt, manager of Traffic Safety Highway Improvement at Ford, said:

"The engineers at the Cornell Aeronautical Laboratory were able to work with only one goal in mind—safety—hence, they have not been inhibited by certain practical de-

sign problems that are important to the automobile manufacturer.

"It is interesting to note that their source of data was the same as that used by Ford engineers when Ford Motor Co. introduced its 'safety package' in 1956."

Safety Belts Stressed—Prof. H. R. Lissner, chairman, Dept. of Engineering Mechanics at Wayne State University and Dr. F. C. Evans, Assoc. Prof. of Anatomy, agree the single most important safety item immediately available is seat belts. They say injuries would be reduced up to 60 pct by this feature alone.

While the auto makers appear cool towards accepting the Liberty-Cornell car at face value, it should be remembered the vehicle is basically only a mock-up model. It can't be operated to test its features. Hence, it is at the same stage where a comparable model of one of the auto makers would be four years prior to anticipated production.

Given experimental data, test results and time, the automakers could change their design concepts for the future. They aren't against safety in their products.

THE BULL OF THE WOODS

By J. R. Williams



Square D announces...

NEW SPIN TOP ENCLOSURE FOR HAZARDOUS LOCATIONS

DAMAGE-RESISTING Acme thread. If you've struggled with "banged-up" threads, you'll appreciate this feature. It's always a breeze to put on and take off tanks for installation, inspection or maintenance.

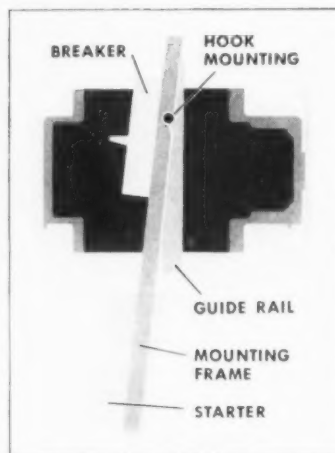
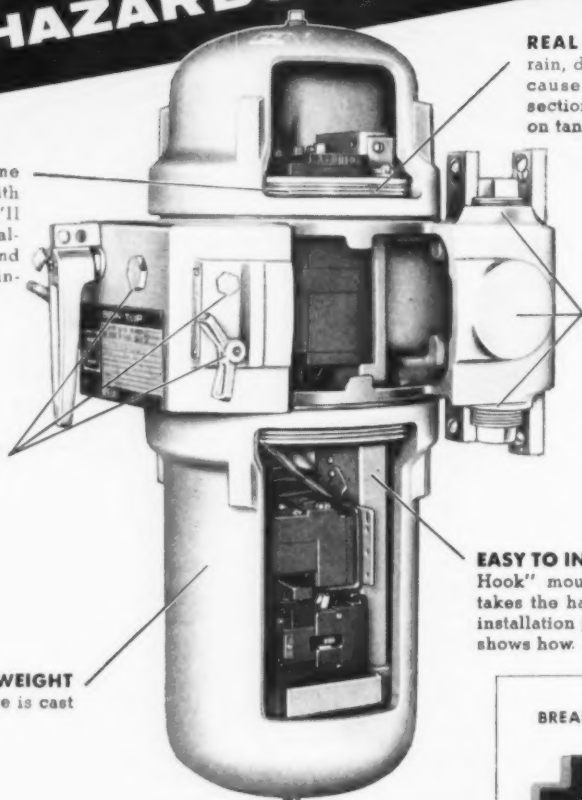
EASY TO ADD pushbuttons or selector switches with easy-to-buy, easy-to-use "off-the-shelf" parts kits.

STRONG and LIGHTWEIGHT
The complete enclosure is cast aluminum.

REAL PROTECTION against rain, dust, dirt and weather because male threads on collar section engage female threads on tank.

INCREASED WIRING SPACE and through-feed conduit entrances for horizontal tap-offs.

EASY TO INSTALL • "Slide and Hook" mounting arrangement takes the hard work out of the installation job. Diagram below shows how.



SLIDE and HOOK MOUNTING

4 SIZES FOR STARTERS SIZE 0 THROUGH 5

CLASS I, GROUP C and D • CLASS II, GROUP E, F, and G

The new **SPIN TOP** enclosure is available from your Square D Distributor in three ways—complete device, enclosure only, or components only...for reversing and non-reversing across-the-line starters and combination starters. And for combination and non-combination two-speed starters.

Write FOR BULLETIN 9990

Square D Company, 4041 North Richards St., Milwaukee 12, Wis.



EC&M HEAVY INDUSTRY ELECTRICAL EQUIPMENT...NOW A PART OF THE SQUARE D LINE

SQUARE D COMPANY

Chances of Tax Cuts Fade Away

More for Defense Means Less for Taxpayers

Talk about tax cuts in Washington has a hollow sound. Prospects are growing dim.

Administration officials already talk about tax cuts as a dead issue.—By G. H. Baker.

■ Has the Russian Sputnik killed chances of a tax cut?

Probably so.

Even before the Reds astonished our military men by successfully launching their earth satellite, the prospect that next year's session of Congress would vote lower rates was not very bright. Rising government expenses were eating into the Treasury's slim surplus.

Chances Dwindle — Now, the prospect of tax reduction has fallen sharply.

Top-ranking officials of the Eisenhower Administration are dropping broad hints that tax cuts should be skipped in the interests of national security.

Take a look at these recent statements:

On the Record — "Maintaining our superiority in military strength must always take priority over the understandable desire to reduce our taxes."—Vice President Nixon.

"Sacrifices will continue to be required, in the form of individual effort or impersonal effort in the form of taxes."—Deputy Defense Secretary Quarles.

ICC Sets Ore Rates

The government has turned down proposed rate reductions on iron ore moving from the St. Lawrence ports to the Youngstown, O., area, and has fixed new rail rates on ore

moving from the St. Lawrence ports by all-rail, and also from the ports of Philadelphia and Baltimore to the Youngstown area.

The Interstate Commerce Commission says rate reductions proposed by the competing roads would have brought on a rate war, and would have caused "needless dissipation of greatly-needed carrier revenue."

Unions Oppose Bills

Bills before the Congress which require election of union officers by secret ballot of the workers are "an attempt to hamstring union activities," and should be defeated, the

AFL-CIO News snarls.

The union paper is especially critical of all proposals to abolish the election system which is employed by the majority of AFL-CIO unions. This system calls for election of officers by the inner councils of unions, not by the rank-and-file membership.

One outstanding exception to this custom is the AFL-CIO United Steelworkers of America, whose constitution provides for the election of officers by the rank-and-file.

Bills calling for open elections are being pushed by Sens. Knowland, R., Calif.; Curtis, R., Neb., and Butler, R., Md.

Defense Spending Nears \$40 Billion



Defense Secretary McElroy

Rockets, Missiles, R and D—Military spending, after having leveled off in recent months, is on the rise again. Increased outlays for rockets and missiles is chiefly responsible for the gain in dollar

volume. And heftier amounts for research and development also is helping push the military spending total to new heights.

Don't expect new contracts to be handed out freely, as they were in past periods of war crisis. A war-time budget is not in sight. The rise in spending will be moderate.

Not Frantic—Although there is considerable pressure being put on the Defense Dept. by individual congressmen to start spending wildly, nothing like that is in the cards.

But the \$38-billion ceiling on defense spending that was imposed last summer by former Defense Secretary Wilson is now obsolete, as new Defense Secretary McElroy makes clear.

What's in the making now is a modest increase of up to \$2 billion in this year's total defense budget. This will bring the total amount to about \$40 billion.

ACCO
for Better
Values

SPEEDY SLING SERVICE with ENGINEERED SAFETY!

ACCOLOY® KUPLEX SLING CHAINS

Quick Service from Distributor's Stock!

• Your nearby ACCO Authorized Sling Chain Distributor now offers a new sling service that saves time and money for you. This is made possible by American Chain's sensational, newly-designed ACCOLOY KUPLEX Sling Chains.

SAFE, STRONG, STREAMLINED

These slings are the *latest and greatest* development in sling chains. All parts in each leg are manufactured *exclusively* by American Chain, of the same alloy, and engineered to be as strong as the chain itself. They are of a streamlined design that reduces the possibility of catching or snagging.

Finally the component parts are factory proof-tested to twice the working load limits—your assurance of maximum strength and safety.

Another valuable feature: all parts remain visible for easy, periodic wear inspection.

TWO STYLES—SIX SIZES

The new ACCOLOY KUPLEX Sling Chains are available in single-leg and two-leg styles and in six chain sizes, from 1/4" through 7/8". All chain is made of Accoloy 125 material. All component parts of each assembly are marked and easily identified as to the size of chain with which they are to be used. Components are *color-marked in orange* for easy identification.

CERTIFICATE OF TEST, issued by ACCO and signed by your Authorized Distributor, is furnished with each sling shipment.

GET THE COMPLETE STORY

You will find it to your advantage to learn the full story of ACCOLOY KUPLEX Sling Chains—how easy they are to assemble and disassemble... how promptly and easily they can be serviced... and how you can benefit from this Great New Distributor Service and this Great New Sling Chain. Write for **Folder DH-54** and name of nearest ACCO Authorized Sling Chain Distributor.



Accoloy Shaped Master Link holds its form under loads up to 18% greater than standard round-section link can



Accoloy Kupler is engineered for maximum strength, safety, simplicity and efficiency; Magnaflux-tested



Accoloy X-weld® 125 Chain in 1/4" through 7/8" sizes; ACCOLOY Endweldur Chain in 1/2" size
*Patent 2,763,768



The new Accoloy KUPLEX Hook—streamlined in design—is proof-tested and Magnaflux-tested before shipment from factory



All components
PROOF-TESTED and **COLOR-MARKED** for easy identification

American Chain Division
AMERICAN CHAIN & CABLE
Bridgeport, Conn. • Factories: *York and *Braddock, Pa.

Sales Offices: *Atlanta, Boston, *Chicago, *Denver, Detroit,
*Houston, *Los Angeles, New York, Philadelphia, Pittsburgh,
*Portland, Ore., *San Francisco

*Indicates Warehouse Stocks

ACCO



Farm Facelift Aids Metal Sales

Widens Market for Metalworking Products

Firms selling the Western farm market benefit from farmer interest in modernization.

Wanted is equipment for irrigation, hay and grain drying, cooling, feed handling and water heating.—By R. R. Kay.

▪ Bringing the farm up-to-date is creating a wider market for metalworking products that spells multi-million-dollar sales for years to come.

Many farmers in central and northern California—No. 1 state of the nation in farm income—are spending to modernize with new methods and equipment.

Here's where their money will go, according to pulse takers at Pacific Gas and Electric Co. And they ought to know. The firm supplies much of the power that makes the farm machinery hum.

Surface, Sprinkler Irrigation—Amount of irrigated acreage, especially in row crops, keeps climbing every year. With it comes the need for first-rate pumping equipment to handle top loads. This means big purchases of both pumping and electrical equipment.

Development of new farm land, although slower than in past years, still calls for drilling of many new wells. So there'll be stepped-up sales of pumps, motors, conveyance piping, and other farm machinery.

Look for growing sales in sprinkler irrigation systems. Most new farms will have them. They cost about \$100 per acre, not counting pumping machinery.

Mechanical Drying—Millions of dollars will go for electric fans,

motors, and bins. Three hundred electric-fan hay driers are already in use, compared with a mere dozen in 1951. And increased drying of rice, corn, and sorghum promises a good market for equipment.

Egg Cooling—Central and northern California's 30,000 poultry operators are learning the benefits of refrigeration. If only 25 pct of the ranchers use refrigeration, the equipment market could hit \$2.5 million.

Livestock Feed Handling—More and more electrically-powered equipment is being used. Farmers may spend some \$10 million to lessen backbreaking chores.

Dairy Water Heaters—Many farmers consider them a must in the dairy house. If the use catches on, there's a real big potential market for water heaters among the 9000 dairy farmers in the area.

Aircraft Layoffs

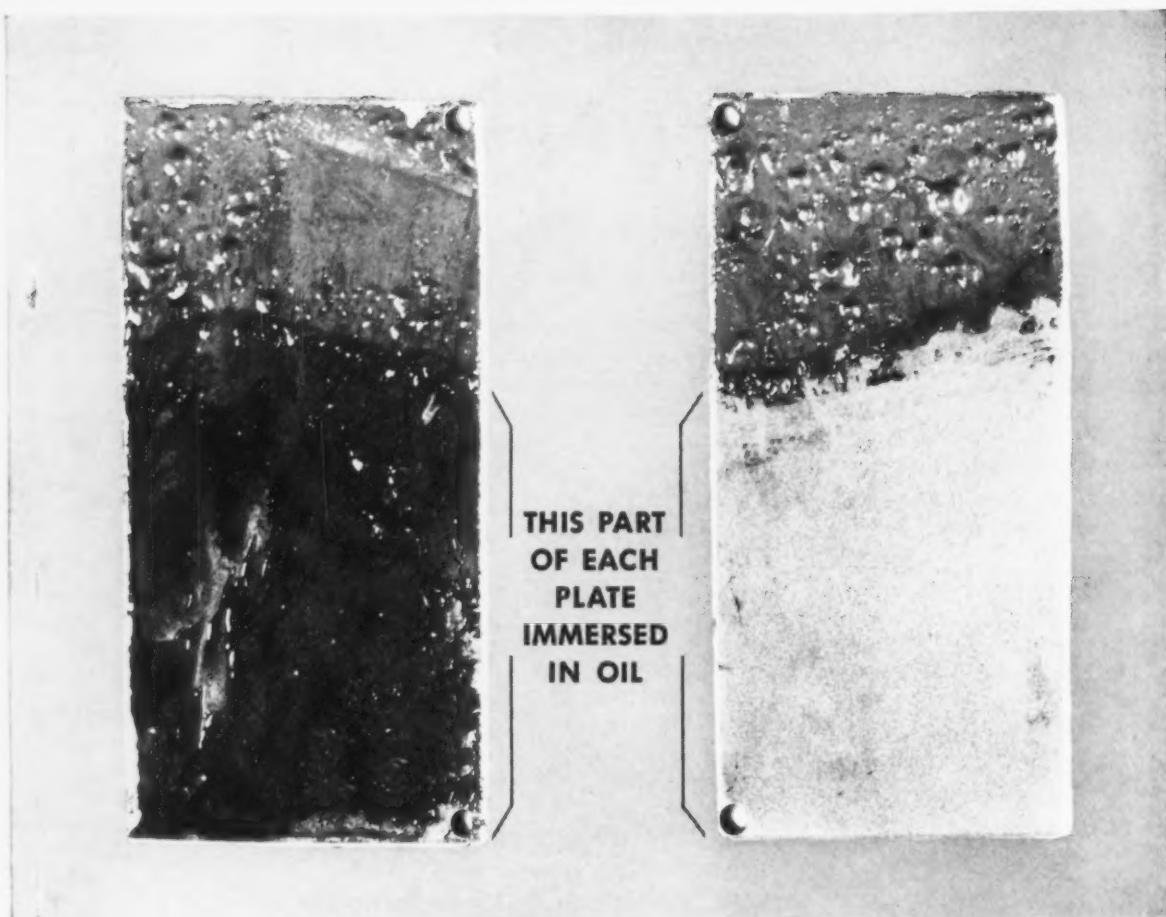
Another 5000 southern California aircraft workers will be job-hunting by year's end. Lockheed Aircraft Corp. says it must let them out of the firm's California Division plants.

And that's not all. It doesn't look good for another 7000 workers during 1958.

Getting Ready for the Rollout



STAGES ALONG THE WAY: Four Lockheed Electras undergo final assembly operations. Beyond painted airplane in foreground is the first Electra, slated for an early rollout. Two fuselages are at the far left.



This sludge-coated metal plate was partially immersed in a beaker containing a *regular hydraulic oil* heated to normal operating temperature. Though the oil was agitated throughout the test, nearly all the sludge remained on the plate.

This similarly sludge-coated plate was partially immersed in a SUNVIS 700 oil, also heated to normal operating temperature. During the same period, with the same degree of oil agitation, the immersed part of the plate was rinsed clean of sludge.

Simple test shows how

SUNVIS 700 OILS CLEAN HYDRAULIC SYSTEMS...WITHOUT SHUTDOWNS

Sunvis 700 oils clean while they work. Their cleansing action removes deposits in systems contaminated by dust, sludge, varnish, and other foreign materials.

SUNVIS 700 oils carry these contaminants in suspension for easy removal. This eliminates costly tear-downs. Systems stay clean. In addition to being ideal for hydraulic systems,

SUNVIS 700 oils are also suited for circulating systems and gear boxes.

If you want exceptional cleaning ability, oxidation stability, rust prevention, film strength, you need SUNVIS 700 oils. Ask your Sun representative for full details, or write to SUN OIL COMPANY, Philadelphia 3, Pa., Dept. 1A-11.

INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY Philadelphia 3, Pa.

IN CANADA: SUN OIL COMPANY LIMITED, TORONTO AND MONTREAL



©Sun Oil Co., 1957



Alfred V. Bodine
President



Ralph J. Kraut
1st vice pres.



Alan C. Mattison
2nd vice pres.



Walter K. Bailey
Secretary



Graham E. Marx
Treasurer



Julian C. Pease
Director

NMTBA Officers for 1958

New officers of the National Machine Tool Builders Assn., left to right: President, Alfred V. Bodine, The Bodine Corp.; 1st vice president, Ralph J. Kraut, Giddings & Lewis Machine Tool Co.; 2nd vice president,

Alan C. Mattison, Mattison Machine Works; secretary, Walter K. Bailey, Warner & Swasey Co.; treasurer, Graham E. Marx, G. A. Gray Co.; director, Julian C. Pease, New Britain Machine Co. They will serve through 1958.

Selling Job Ahead for Builders

September's sagging sales are not necessarily alarming, says outgoing NMTBA chief.

Long range outlook is good, he says, but at present it's the hard sell.—By E. J. Egan, Jr.

■ New orders for metal cutting machine tools totaled an estimated \$29 million in September, a drop of 35 pct below August volume and 64 pct under September, 1956.

Members of The National Machine Tool Builders' Assn. pondered this sobering news as they turned out in record numbers for their 56th Annual Meeting.

One Bright Side—Quizzed about the surprisingly large attendance, one builder commented wryly: "It's either a case of 'misery loves company' or an urge to mix a little convention fun with business while we can still afford to make the trip."

Although the order-booking picture reminds many machine tool executives of the bleak days following World War II, the billing side

doesn't look too bad at the moment.

Good Annual Outlook—Outgoing NMTBA president J. A. Raterman, who is also board chairman and president of The Monarch Machine Tool Co., Sidney, O., reminded his fellow builders that total shipments for this year should be at least \$800 million.

Calling this "a very substantial volume," he added, "This figure has been exceeded in only four of the last 13 years, and three of those four years reflected national defense demand due to the Korean crisis."

Alarm Unjustified—He admitted that the September dip in new orders was deeper than anything he foresaw six months ago, but maintained that, "I cannot get particularly alarmed about the present situation."

For one thing, Mr. Raterman said that in recent years of peace-time business (1946-50, 1955-56) average annual production was \$434 million. That is "an amount considerably below what we can expect today if new orders continue at the

present rate," he declared. (Average monthly rate for the July-August-September quarter is \$43 million.)

Selling Job Ahead—Bidding his audience to look toward the future, Mr. Raterman said it would call for more persuasive selling. "I think we can do this sales job," he said, and then ticked off the reasons underlying his optimistic outlook:

1. Figures on age and obsolescence of machine tools in U. S. plants indicate "an enormous potential replacement market."

2. "Above and beyond this market lies the future demand for new machine tools for plant expansion projections delayed, but not abandoned."

3. Machine tool industry research and development is "today so rapid that a machine which many a company thinks is 'good enough' today will not be good enough for tomorrow."

Mr. Raterman also urged his audience to prepare new equipment designs now for the fast-approaching 1960 Machine Tool Show.

INDUSTRIAL BRIEFS

Fuel for Polaris—A \$6.2 million contract has been awarded to the Missile Systems Div. of Lockheed Aircraft Corp. by the Navy. Contract is for continued development of the Navy's fleet ballistic missile, Polaris. This contract award extends the work within this program through fiscal year 1958. The Polaris missile will have a 1,500 mile range and is being designed to fire from surface ships as well as submarines.

AEC Exec.—K. A. Dunbar has been appointed manager of the Atomic Energy Commission's Chicago Operations Office at Lemont, Ill. He succeeds J. J. Flaherty who resigned Oct. 1, to return to private industry. Dunbar will assume his new duties on or about Dec. 1, 1957.

Movies Are Better Than Ever—
The Colorado Fuel & Iron Corp. has a new booklet describing its 14 sound-color motion pictures available on a free loan basis. Films describe various aspects of mining, steelmaking and the manufacture of finished steel products. Booklet is available from CF&I Corp., P. O. Box 1920, Denver, Colo.

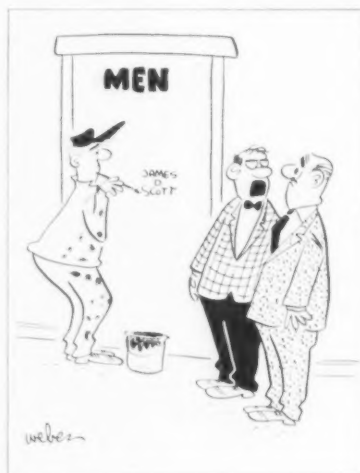
Nothing Could Be Finer—Joseph T. Ryerson & Son, Inc., opened a new plant in Charlotte, N. C. Investment represents over \$1 million for building and equipment. The new steel service plant will serve the southeastern section of the country from stocks of bar, structural, plate, sheet and tubular steel.

Full Tool Box—Pendleton Tool Industries, Inc., Los Angeles, has entered into the manufacture of mechanics' tool boxes through purchase of Duplex Mfg. Corp. Pendleton Tool paid an undisclosed amount of cash for all of the outstanding stock of the Sherman, N. Y., firm. Duplex will operate as a wholly-owned subsidiary.

A Big Job, Though—A. M. Cox, president of Pittsburgh Commercial Heat Treating Co., has been elected president of the Smaller Manufacturers Council, Pittsburgh. Mr. Cox is president of J. P. Devine Mfg. Co. He also heads Pittsburgh Wire Form & Mfg. Co. and Pride Mfg. Co.

Complete Overhaul—The Production Engine Dept., General Electric Co., has realigned its manufacturing organization, forming a Manufacturing Section. There has been formed within this section, a materials sub-section, which has the responsibility for all purchasing activities within the Production Engine Dept. It will encompass all materials activities previously performed within the prior Assembly and Spare Parts, Components, Manufacture, and Facilities Sections.

Under One Roof—Construction is underway on the new Janitrol Aircraft Div. manufacturing, engineering, research and testing and office buildings in Columbus, O. The test facility and buildings will cost about \$2 million. Janitrol's engineering and sales departments as well as manufacturing, and production control, will be located at the new plant. Completion is scheduled early next spring.



"This is only until our new building is finished, Scott—then you'll have an office with more privacy."

Light Transaction — Maysteel Products, Inc., Milwaukee and Mayville, has acquired Magnesium Products of Milwaukee. The business will be continued as a subsidiary in its present location with no change in personnel. Magnesium Products is a contract-manufacturer of light metals.

Cool Auto Market—The York Div. of Borg-Warner Corp. has completed negotiations with Lehigh Mfg. Co., division of Lehigh, Inc., of Easton, Pa., for the purchase of the company's automotive air conditioning compressor design and related manufacturing facilities in Lancaster, Pa. York is planning an engineering and research program at its York Research Laboratory to further expand its activities in automotive air conditioning.

Spring Centennial—The Wallace Barnes Co. division of Associated Spring Corp., Bristol, Conn., is celebrating its 100th anniversary of springmaking this year. Wallace Barnes, manufacturer of clock springs, commenced business in 1857. Today Wallace Barnes springs touch on almost every phase of industry and life.

Stock for Dow Men—The Dow Chemical Co. has announced a price of \$42.25 per share on an issue of 200,000 shares of its common stock to be offered its employees and those of its subsidiaries and certain associated companies. About 30,000 employees will be eligible to subscribe for stock under the 1957-58 Employees' Stock Purchase Plan. It is the ninth since 1948 offered on a payroll deduction basis.

Republic Goes Civilian—Republic Aviation Corp. has formed a Commercial Contracts Div. Republic has produced solely for government military branches for 10 years. New division has been instituted to provide engineering, development and manufacturing services to industry generally and will be a supplier to other aviation companies and allied industries.

NEW ALLIS-CHALMERS

POWER SHIFT

TORQUE CONVERTER DRIVE

Makes lift truck operation *easier than ever before!*



SIMPLE FLICK OF A LEVER CHANGES DIRECTION — SMOOTHLY

Just flip lever ahead for forward, back for reverse — with light finger-tip touch. You'll be surprised how fast and smoothly you change directions, without jerking. You work fast, stay fresh, get more done.

ENJOY NEW SAFETY OF OPERATION

Have full control — ALWAYS, with every move forward or reverse made under constant, positive power coupling. No coasting, no dangerous delay between power application and braking.

Brake to stop — merely release pedal to restart. Applying brake pedal, at left of accelerator, does not break power coupling. This saves time and effort stopping and starting.

There's additional safety in two new features: engine will not start while truck is in gear — and POWER SHIFT Drive automatically returns to neutral if operator leaves the seat.

POSITION LOADS QUICKLY, ACCURATELY WITH NEW INCHING CONTROL

Inching pedal lets you move fast or just creep, always under *full, positive* control. With this you also have *full engine power* for fast lifting, even while inching.



MULTIPLY WORK CAPACITY, INCREASE GRADABILITY WITH TORQUE CONVERTER DRIVE

The torque converter, on all Allis-Chalmers trucks with POWER SHIFT Drive, automatically matches power to load, multiplies working ability, increases gradability.

SIMPLICITY, RELIABILITY, TOO

POWER SHIFT Drive is simple to operate and service — dependable, too.

Get the complete story on how POWER SHIFT saves time, makes driving trucks easier, helps get more done. See your Allis-Chalmers material handling dealer... or write for Bulletin BU-465.



Here's new smoothness of operation — with more speed, less fatigue.

ALLIS-CHALMERS, MATERIAL HANDLING DEPT., BUDA DIVISION, MILWAUKEE 1, WISCONSIN

ALLIS-CHALMERS



D. T. Morgenthaler, appointed president, Foundry Services, Inc., Columbus, O.

J. M. Stuart, named vice president, Reynolds Aluminum Sales Co. and made general manager, eastern sales region, Reynolds Metals Co., New York headquarters; **H. J. Williams**, appointed executive sales representative, New York.



F. W. Jenks, elected president, International Harvester Co., Chicago.

W. T. Ingram, **Paul Murphy** and **C. M. Mapes**, appointed vice presidents, Reynolds Aluminum Sales Co.

E. F. Bauman, promoted to director of purchasing staff activities, Federal-Mogul-Bower Bearings, Inc., Detroit.



J. S. Stanford, named executive assistant to the vice president for sales of Olin Aluminum, Olin Mathieson Chemical Corp.



P. H. Farley, appointed manager, distributor and contractor sales, Anaconda Wire & Cable Co.

J. E. Rowe, named executive vice president, Tomkins-Johnson Co., Jackson, Mich.; **W. J. Remund**, promoted to vice president, sales; **A. P. Jankowski**, promoted to sales manager; **R. L. Curtis**, advanced to asst. sales manager.

J. H. Sharda, appointed sales training manager, LeTourneau-Westinghouse Co.

Jerry Cummins, appointed general sales manager, Atlas Precision Products Co., Div. of Prudential Industries, Inc.



G. W. Edick, promoted to sales manager, Domestic Div., Cooper-Bessemer Corp., Mount Vernon, O.

MEN IN METALWORKING

Denzil Hawkins and **Theodore Rancont**, named vice presidents, The Producto Corp., Detroit.

G. R. Ardill, appointed manager, Los Angeles sales office, Aluminium Limited Sales, Inc.

G. A. Bricmont, appointed asst. general sales manager, The Park Drop Forge Co.

C. A. Schulte, appointed manager, Vancoram plant, Vanadium Corp. of America, Vancoram, O.

A. J. Jones, appointed director, engineering, Motch & Merryweather Machinery Co., Cleveland.



Dr. A. M. Aksoy, appointed manager, Applied Research Laboratory, Sanderson-Halcomb Works, Crucible Steel Co. of America, Sycamore, N. Y.

M. J. Bartholomey, promoted to asst. to the sales manager, and **D. E. Russell**, named manager, customer service, Eastern Stainless Steel Corp., Baltimore, Md.

J. T. Castles, appointed sales manager, Silicone Products Dept., General Electric Co., Waterford, N. Y.

Following appointments are within Copperweld Steel Co.'s Steel Div., Warren, O.: **K. L. Kinser**,



Beauty

for the life of the car

1957

1958

1959

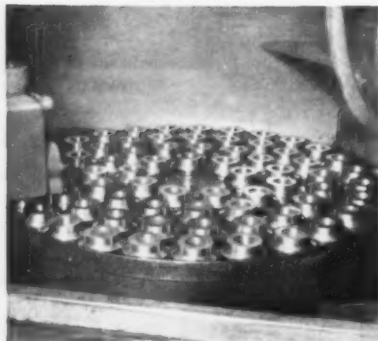
Automobile trim of
**Superior
Stainless** STRIP STEEL

You can't tell the age of a car by its stainless steel! After a thousand or *two hundred thousand miles* of driving, Superior Stainless gleams good as new.

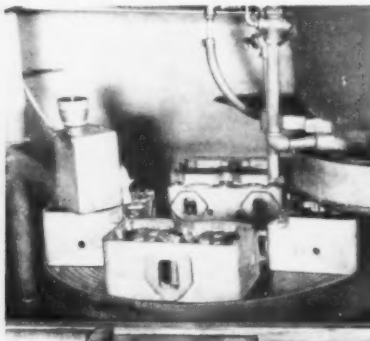
- Enjoy the beauty of stainless on the cars *you* buy —costs you nothing in care, gives you everything in pride and pleasure!

Superior Steel
CORPORATION
CARNEGIE, PENNSYLVANIA

Whatever your grinding job may be...



200 adjusting screw washers are ground on one side in one hour. Stock removal .025"; limits $\pm .001$ ".



Tops of cylinder heads ground 21 per hour; stock removal 3/16" to 1/4". Bottoms 55 per hour; stock .012"; limits $\pm .001$ ".

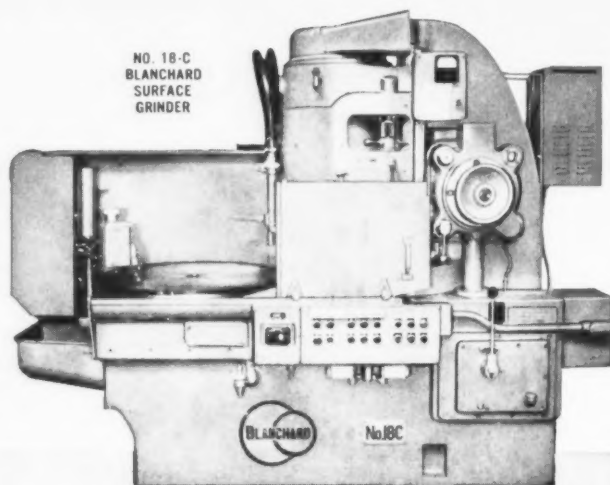


56 cast iron plates are ground on one side in one hour. Stock removal .140"; limits .001".

for best results...

The Blanchard No. 18-C Surface Grinder has the speed and precision that guarantees economical grinding on an endless variety of jobs. After the initial setup, the automatic cycle handles every operation from start to finish. The operator is freed to prepare the next load or to operate a second No. 18-C Grinder.

Put it on the Blanchard



The 18-C Automatic Cycle...

Moves chuck to grinding position and starts it rotating

Starts wheel rotation and coolant pump

Provides rapid wheel approach to work

Engages power down-feed at preset rate

Changes to fine feed just before finished size is reached

Stops feed when work is to size — "sparks" out. Raises wheelhead

Stops wheel, coolant pump, and chuck

Moves chuck to loading position — demagnetizes chuck

Can be changed quickly to manual operation

Automatically Controls Size!

Send today for your free copy of 18-C folder.



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ROLLWAY THRUST BEARINGS...

→ $\int_{2''}^{36''}$ *Design + precision + quality that
do the job in the one best way...*

Size in Rollway Thrust Bearings—big or little—is a mere matter of operating “geometry” and of the machinery to produce it. But design, precision and quality are dimensionless quantities that vary widely according to loads, speeds, temperatures . . . yet in the end sum up to a single constant: “*To do the job required in the one best way.*”

Of course, we're proud of this 2¼ ton bearing with its thrust load capacity of 4,630,000 lb., its diameter of

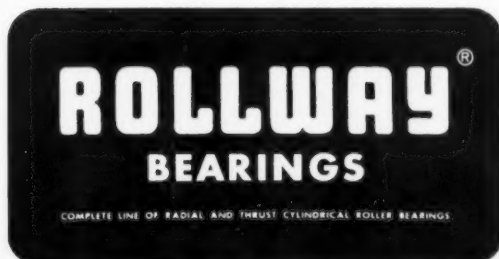
almost 3'-0" and its 3 roll assemblies with 6 precision thrust plates matched to equalize load and deflections for each stage. But we're equally proud of the little 2 inch in Design Engineer Grigson's hand. Despite the great difference in size, each has been carefully worked out “*to do the job required in the one best way.*”

Whether you want a bearing for an oil rig, an extruder, a pulp mill jordan, a crane hook, a heavy duty lathe and countless other uses, Rollway has one that will do the job “in the one best way.”

5 Standard Types:

- Single aligning
- Double aligning
- Tandem
- Single acting
- Double acting
- Special-purpose types to your order

Our engineers will gladly consult with you regarding the standard or special-purpose types you need.



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How to

drive it with **Acme** chain and sprockets

Acme Precision Roller Chains and Sprockets are easily adaptable for most any drive where maximum efficiency is essential, a few of which are illustrated below.



Acme Chains and Sprockets deliver Positive — Efficient — Economical — Flexible — Rugged — and Quiet Power Transmission. For the solution of your power transmission problems, send them to Acme.



Write Dept. 21-A for new illustrated 100 page catalog which includes new engineering section showing 36 methods of chain driving.



appointed district sales manager, Indianapolis sales office; **J. D. McKinnon**, named district sales manager and **P. C. Patch**, joins the Steel Div. sales office in Chicago; **R. E. Barcus**, named manager, sales, Milwaukee.



T. B. Russell, elected vice president, The Mount Vernon Bridge Co., Mount Vernon, O.

R. E. Bankert, appointed asst. manager, Sales Personnel & Training Dept., Kaiser Aluminum & Chemical Sales, Inc., Chicago.

E. T. Pratt, Jr., named director of budgets, IBM World Trade Corp., New York.

G. M. Brydon, appointed general manager, Butterfield Div., Union Twist Drill Co., at Derby Line, Vermont and Rock Island, Quebec.



J. W. Stottlemeyer, named sales manager, Eastern Stainless Steel Corp., Baltimore, Md.



A. C. Wedge, elected vice president, manufacturing, DeWalt Inc., subsidiary of American Machine & Foundry Co.

P. J. Baltes, appointed Ohio district sales manager, Duff-Norton Co., Pittsburgh.

D. H. Miller, named manager, Western Div., Square D Co., Los Angeles headquarters.

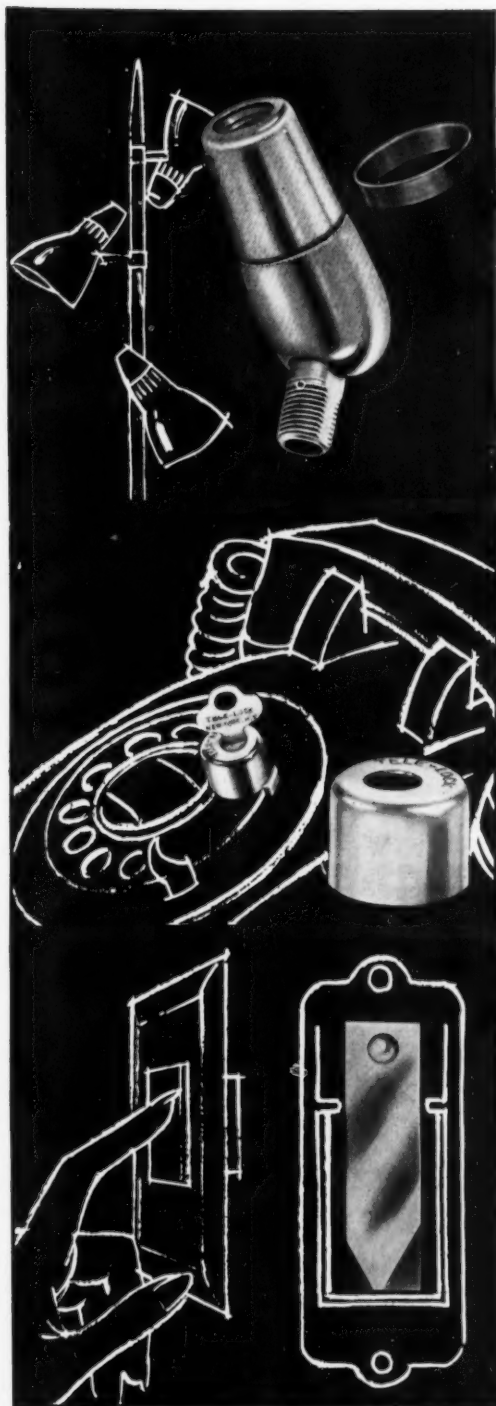
A. M. Haines, appointed controller, Henry Disston Div., H. K. Porter Co., Inc., Philadelphia.

M. A. Wrotniak, Jr., named foreign sales manager, Electrode Div., Great Lakes Carbon Corp.



L. R. Garza, appointed manager, International Div., F. J. Stokes Corp., Philadelphia.

Dr. C. A. Stiegman, named technical director and **Dr. J. H. Brown**, general manager, Niagara research and development, Hooker Electro-



How three manufacturers use Anaconda superfine-grain alloys

DURAFLEX® makes swivel lamps swivel better

Berger Machine Products of Maspeth, New York, manufacturers of lighting-fixture parts, had a problem with a swivel fixture. To allow adjustment of the reflector, the two steel parts (illustrated) have to rotate 350 degrees. Steel-on-steel froze and locked. A brass ring bushing helped, but being soft allowed the steel to cut in and bind. Berger tried Duraflex, Anaconda's superfine-grain phosphor bronze, and found the answer. Its springiness, hardness and wear-resistance made a snug fit which turned easily and would hold in any position.

FORMBRITE® helps finish phone locks faster

Tele-Lock, an ingenious device for locking a dial phone, is encased in a chromium-plated brass cup. Slaymaker Lock Co., Lancaster, Pa., was using ordinary drawing brass for this cup and found finishing costs high. They turned to Formbrite, Anaconda's superfine-grain forming brass. The cups were easy to form; the slight extra spring and hardness made the fit perfect. The smooth surface of Formbrite eliminated one polishing operation and provided an ideal surface for a lasting chromium plate.

DURAFLEX makes superior contacts for Touch-Plate®

Touch-Plate Mfg. Corp., Long Beach, Calif., makes low-voltage switch systems for control of lighting in the home. It takes only a flick of the finger or elbow on the momentary contact switches to actuate a relay, or set of relays, which turns lights on or off in one room or through the house. For the contact strips in Touch-Plate wall switches they now use Duraflex, Anaconda's superfine-grain phosphor bronze, because they found it has more spring, better recovery properties. Duraflex is now used also for contacts in the relays which operate the Touch-Plate system.

FOR INFORMATION WRITE: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont.

6767

DURAFLEX

The new superfine-grain phosphor bronze with greater endurance limit.

FORMBRITE

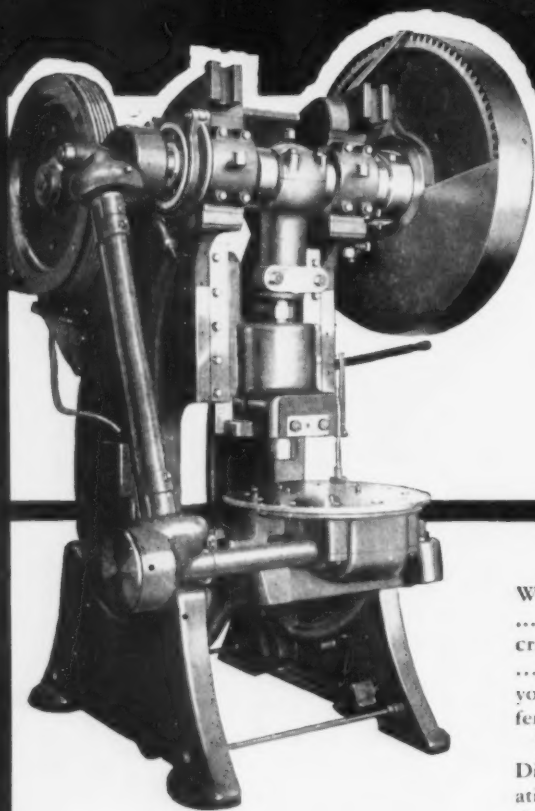
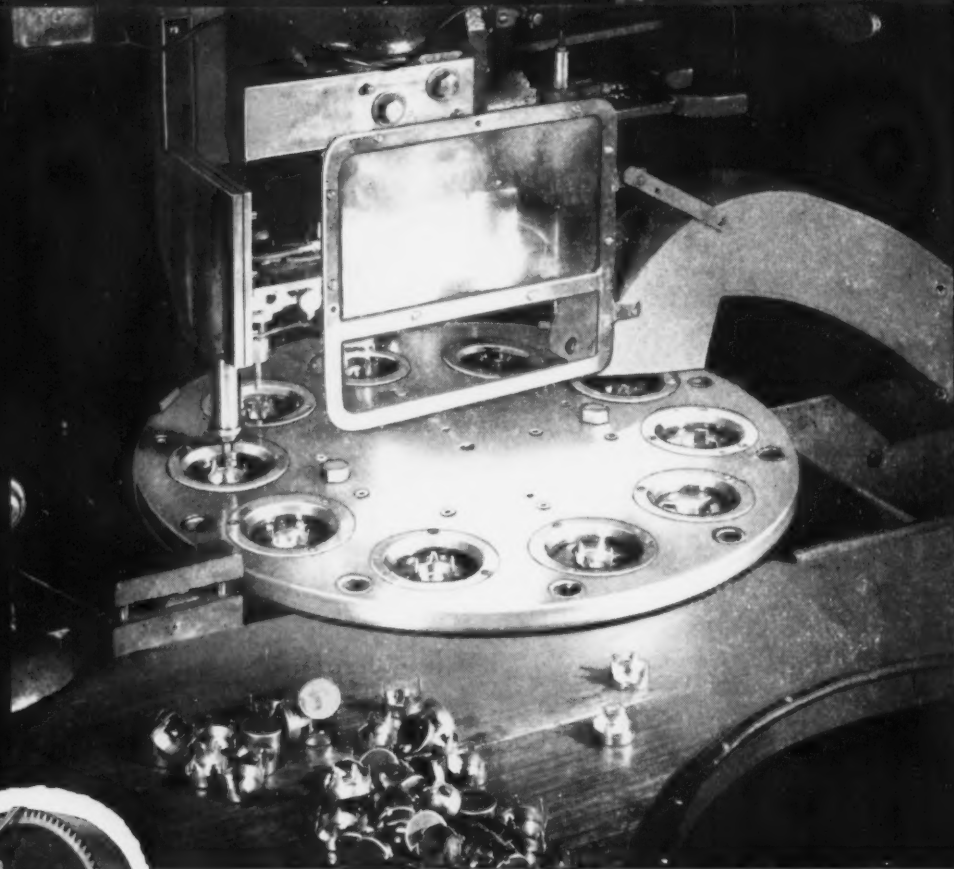
The new superfine-grain drawing brass that cuts finishing costs.

ANACONDA®

PRODUCTS

MADE BY THE AMERICAN BRASS COMPANY

MODERN
FEDERAL
DIAL
FEEDS
have what
it takes!



No. 7 Dial Feed
Capacity, 80 tons

VERSATILITY plus AUTOMATION

What's the job? Drawing...staking...forming...piercing...stamping...crimping...punching...broaching...burring...assembling? Maybe in your plant it's all of them, or a different, unique operation.

We'll lay two-to-one that Federal Dial Feeds are just what your operation needs. For the possibilities of this press with special jiggling are

practically unlimited. Add automatic feed and ejection and you have the answer to many cost problems.

Modernize now with Federals and eliminate the need for expensive, specialized equipment. Rugged, precision-built Federals embody the finest materials and workmanship. Available in sizes from 6 to 80 tons. *Write for new Dial Feed Catalog.*

THE FEDERAL PRESS COMPANY
702 Division Street, Elkhart, Indiana

FEDERAL DIAL FEED PRESSES

32 Years' Experience in Dial Feed Engineering and Construction

chemical Co., Niagara Falls, N. Y.

M. A. Norcott, appointed manager, aluminum sales, Korhumel Steel & Aluminum Co., Evanston, Ill.

H. J. Watson, promoted to manager, Service Dept., The Trane Co., La Crosse, Wis.



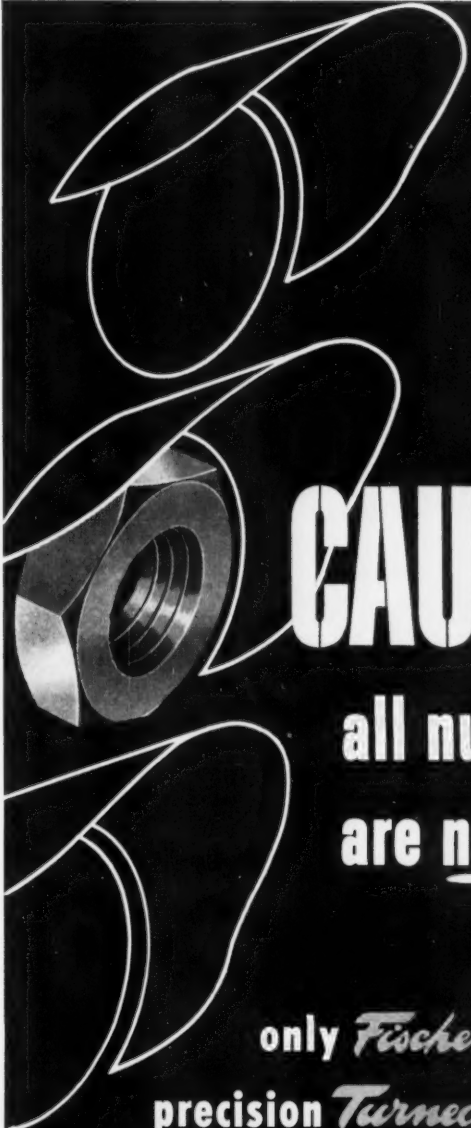
W. A. Kerr, appointed general sales manager, Electronics & Instrumentation Div., Baldwin-Lima-Hamilton Corp., Waltham, Mass.

B. M. Hill, appointed sales manager, Hydraulic Div., Parker Aircraft Co., Los Angeles, Calif.



E. A. Baley, appointed sales manager and asst. general manager, The Park Drop Forge Co.

G. A. Stone, appointed district manager, Dallas office and factory branch store, Link-Belt Co.; **W. R.**



CAUTION


all nuts
are not alike!

only *Fischer* gives you
precision *Turned* nuts
at competitive prices!

At Fischer, this is the difference. Brass or aluminum... your nuts are produced on unique high-speed machinery... **TURNED** to exacting specifications. "Blanks" and rejects are eliminated.

PRICE...no premium. DELIVERY...prompt.

Write today and ask for our catalog. Better yet... send us your specifications and we'll prove to you that there is a difference in nuts.



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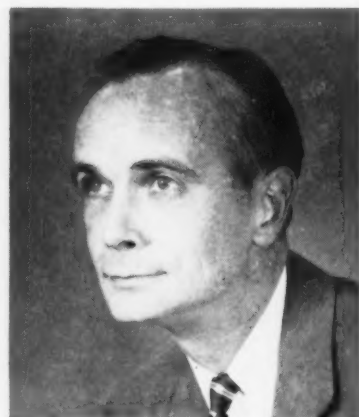
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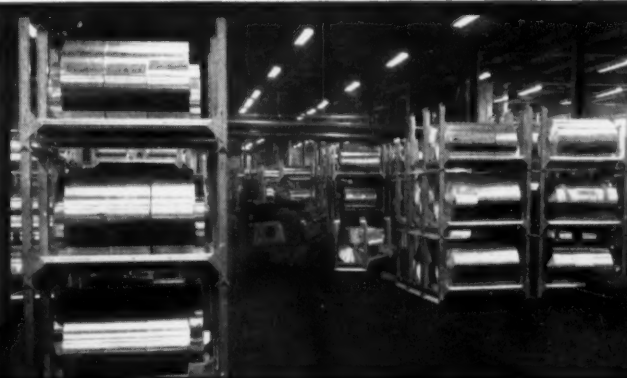
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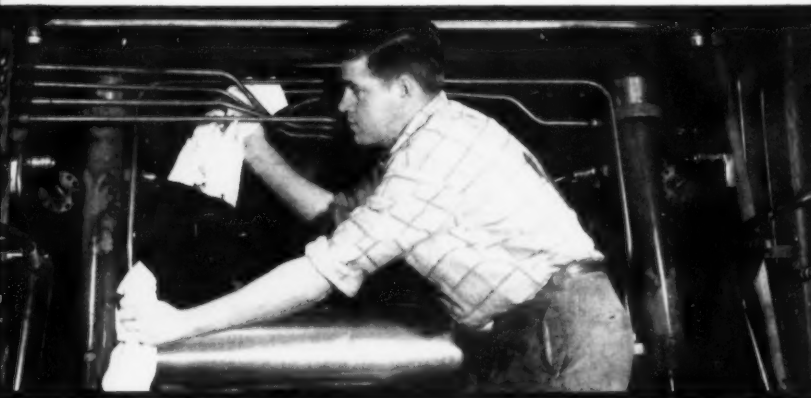
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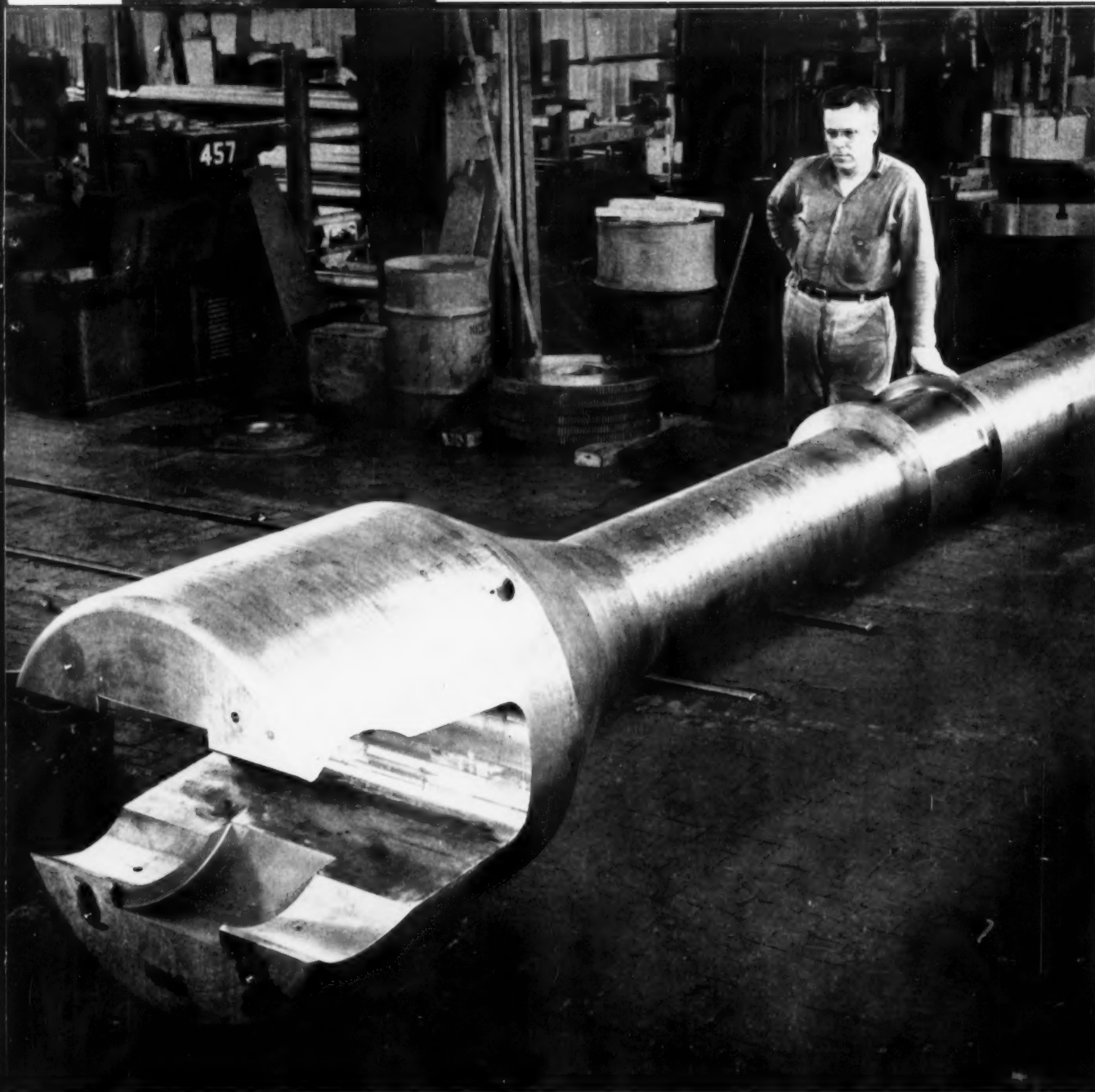
E. B. Greene, honorary chairman of the board, The Cleveland-Cliffs Iron Co., Cleveland.

Dr. P. D. Merica, 68, retired president, The International Nickel Co. of Canada, Ltd.

K. N. Baker, 39, manager, Hercules Powder Co.'s Explosives Dept. sales office, Birmingham, Ala.

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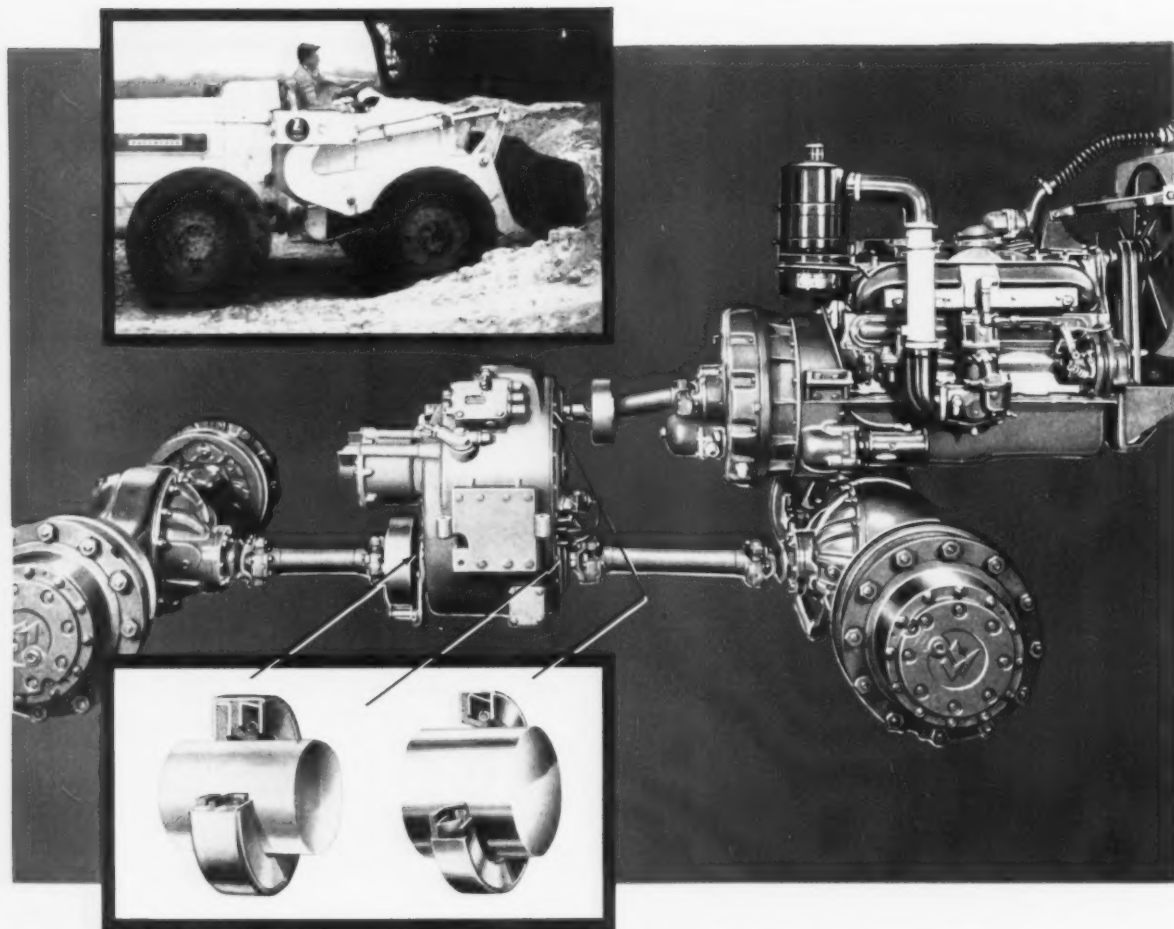
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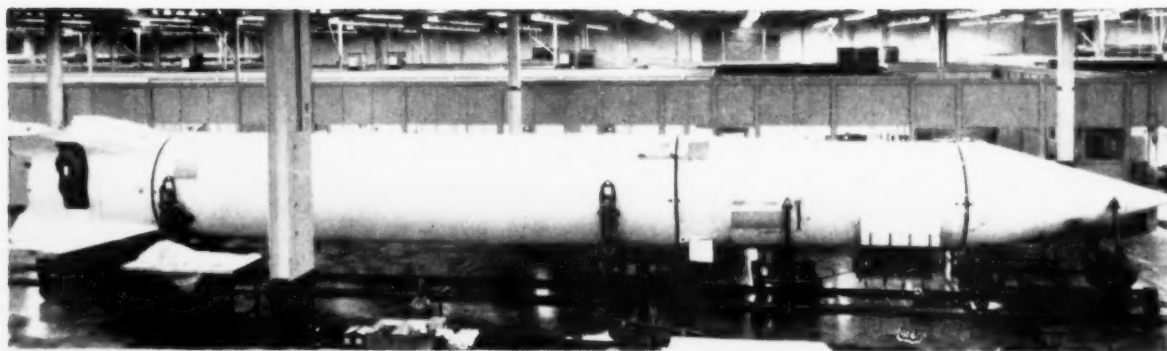
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TOP PRIORITY: Missiles, like this Army Redstone at a Chrysler Corp. plant, are critical defense items.

Can You Machine Missile Hardware?

By E. J. Egan, Jr.—Machinery Editor



HERE'S THE KEY: Missile hardware produced on tracer-controlled machines is only as good as the templates used. All, like this one, are precision finished and carefully checked.

Probably you don't know whether you can machine missile hardware. Maybe you've never given it a thought.

But there's a lot of this work to be done right now. And there's plenty more coming.

Just what are the opportunities? What talents and equipment are needed? Here are the answers from one of the pioneers in this field.

■ America's machining skills are being challenged by the rocket-and-guided-missile age. If the challenge was not clear heretofore, it should be unmistakably so now.

Launching of the Soviet satellite into outer space puts U. S. progress in rocket power under the glare of a bright new spotlight. The role played by the metalworking industry is a big part of the picture thus revealed—equal or bigger in scope than that filled by the chemical or electronics industries.

For rockets and missiles, though they may be fueled by exotic chem-

icals and guided by electronic brains, are essentially assemblies of metal components. To produce varied items of missile hardware so that each one functions perfectly calls for top metalworking skills.

It's Not Easy—From initial alloying to final inspection, missile hardware generally demands a little something extra. Nowhere is this more true than in the machining area.

But only a handful of facilities, about 15 in all, have stepped for-

ward to carry the machining load for the nation's rocket and missile programs.

The load on these shops is heavy now, and it's certain to reach staggering proportions very soon. The pressure mounts as prototype missiles become operational and as new prototypes come off the drawing boards. Always, too, the demand is for better hardware and faster production.

Big Opportunities — Unquestionably, for those shops that are will-

ing and able, the missile hardware machining business is chock full of ground-floor opportunities. Talk to the big firms who hold prime contracts for complete missile systems (THE IRON AGE, Oct. 10, p. 79). They're beating the bushes every day looking for qualified subcontractors.

Listen to Mr. F. H. Smith, director of subcontracts for Raytheon Mfg. Corp. His firm is the prime contractor for both the Hawk and Sparrow III missiles.

"The door is wide open for expert machining facilities to get into the missile hardware field," Mr. Smith says. But the requirements are strict.

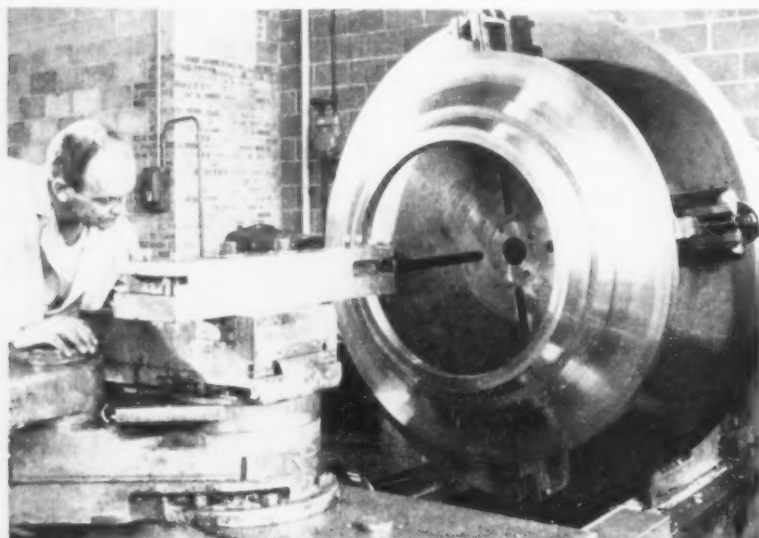
"Some firms don't have the necessary equipment. Others don't have a proven record of experience in doing really tough jobs. We can't take chances on the fellow who 'thinks' he can do a good job, or the one who promises to do his best."

This Firm Knows—What does it take to make good in the missile hardware machining business? One man who knows for certain is Mr. J. H. Kauffmann, president of Diverssey Engineering Co. His firm, generally conceded to be the biggest in this specialized field, operates three plants: two in Franklin Park, Ill., and one in Huntsville, Ala., near the Army's Redstone Arsenal.

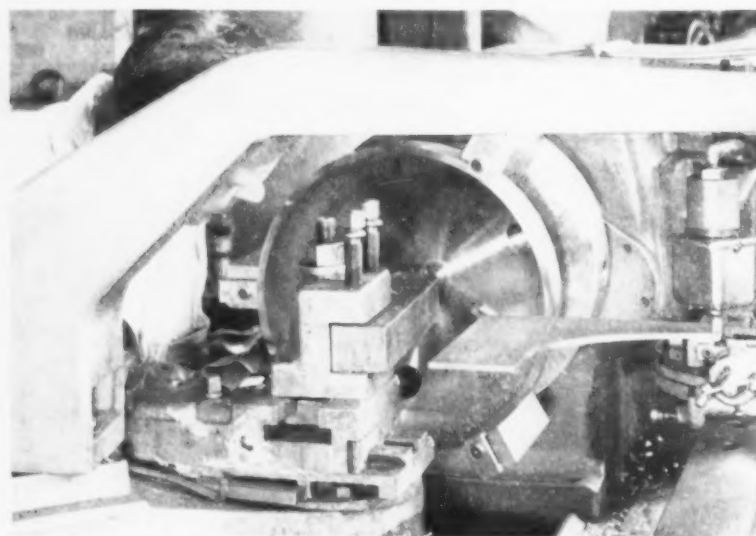
"Essentially," Mr. Kauffmann says, "anyone in this business must be equipped to do three dimensional contour machining on such hardware items as nozzles, blast tubes, adapters, motor bodies, accumulators, solid fuel cores and the like. In many cases, we assemble these components into complete rocket motors.

"The machining work is seldom the straight-line variety. Many of the parts have both internal and external contours with the added complication of thin, tapering walls. Tolerances for wall thicknesses, concentricity and parallelism have to be held within a few thousandths of an inch at most. In many cases, we're required to work within a few ten-thousandths."

Use Hardened Steels—"Where internal and external configurations



TOUGH STUFF: A 48-in. swing tracer lathe turns this superalloy forging (Re 54-56 hardness) into an adapter for a missile propulsion system. Final surface finish is 32 microinch. Tolerance is ± 0.001 in.



INSIDE WORK: Contouring the ID of a forward closure for a rocket motor. Workpiece is aircraft quality 4130 heat treated to Rc 43.

rule out the use of grinding operations," Mr. Kauffmann continues. "hardware must be finished by machining—often to 16-microinch surfaces. Close tolerances and fine finishes must be achieved, for the most part, on steels and superalloys heat treated to 50 Rc and harder."

Machining such hard materials calls for using carbide and ceramic cutting tools almost as a matter of course. Diversey experiments constantly with new grades. Most of those used are throw-away types.

Getting top performance out of these cutting elements calls for speedy, powerful and rugged machine tools: milling machines, drill presses, horizontal boring machines, tracer-type planers and the like. Lathes, of course, make up the bulk of the table of equipment for missile hardware machining.

Tracers Work Hard—As Mr. Kauffmann puts it: "Our Monarch tracer-controlled lathes are the workhorses of our business; we have 13 of them running on practically a round-the-clock basis.

"The way we use our machine tools points up what is really the most important requirement in this business," he adds. "It's the ability to do repetitive precision work on a production basis. That's a bit different than doing a slow, painstaking job on one or two prototype parts."

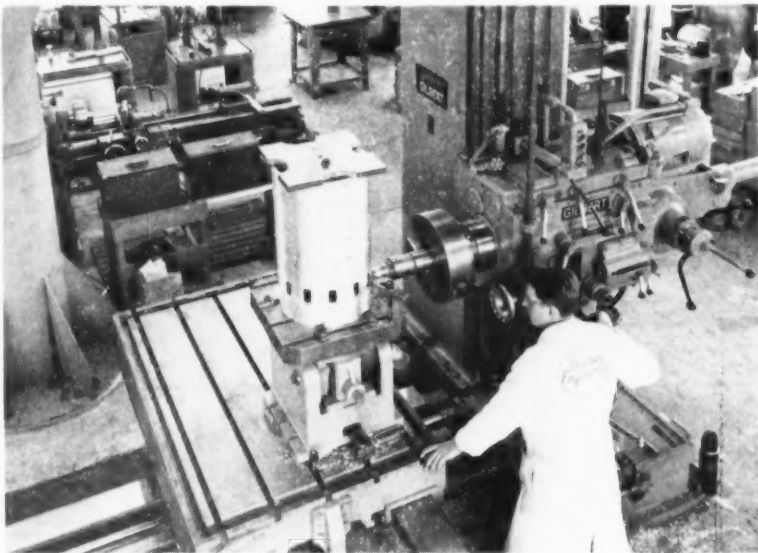
The firm does a lot of work on prototypes, naturally. But it approaches each job as though it were a production order for 50 or 70 pieces, which it might well turn out to be if the item proves out in testing.

Hires Top Men—To encourage this production-minded attitude, Diversey hires the best men it can find. The company urges workers to use their ingenuity to the utmost. As a result, ways of doing jobs are never considered unalterably "set." Major and minor triumphs in time and cost saving turn up almost every day.

For anyone considering entering the missile hardware machining field, there's little doubt that Diversey's techniques have been successful.



NO TURNING: Not between the ears on this dome section of a missile motor's forward closure, anyway. Job is done on this tracer-controlled planer. Workpiece is hardened (Rc 43) 4130 steel.



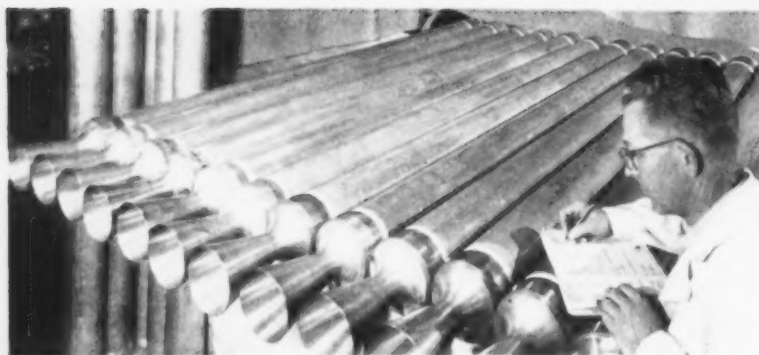
THREE-PLY SANDWICH: Tolerance for holes bored in this steel-aluminum-magnesium missile body section are ± 0.002 , -0.000 .

Mr. Kauffmann started the firm just 7½ years ago with \$5000 plus the machining wisdom he had acquired through years of shop and supervisory experience in the Chicago area. During the Korean emergency, the company was an important factor in the machining of forging tooling for artillery shells.

Down, Then Up—When the emergency ended, Diversey's shell

contracts were cancelled in a hurry, dropping from a value of \$2.5 million to \$10,000 in just seven days. The firm got into other lines of work fast: jet engine parts, components for nuclear reactors, and finally missile hardware—in a big way.

Today, the company operates \$1.5 million worth of ultra modern machining and gaging equipment in its three plants. Every item is fully paid for, and new equipment worth



LAST CHECK: Assembled solid-propellant rocket motors have aluminum bodies, 4130 steel heads and adapters. Concentricity required throughout the approximate 9-ft length is ± 0.003 in.

another half-million dollars is on order.

At present, the firm produces hardware for more than 15 separate missiles. Billing for this year will approach \$3.5 million; they'll total \$8 million or more in 1958, Mr. Kauffmann believes.

You Must Sell—Business on this scale doesn't just walk in the front door. It took plenty of hard selling in the early days. Even now, when the firm is automatically placed on many bid lists, the selling effort never lets up.

"We never take customers for granted," Mr. Kauffmann says. "Competition is pretty keen in this business already, and it will get tougher right along. That's why we need to keep selling."

Diversey doesn't object to competition. The firm's management knows that the booming missile business needs more hardware sources. The present ones will have to grow, too. Although it's the biggest factor in the hardware machining field, Diversey still employs less than 200 people for all three of its plants.

Take Whole Job—This company's past and future growth pattern shows that potential hardware sources may need more than just machining skill to succeed. They'll probably have to show their willingness to contract for hardware items—or even complete rocket motor assemblies—on a start-to-finish basis.

This means assuming full responsibility (including financial) for buying raw materials; for farming out necessary casting, forging, welding or heat treating work. The machining source might limit itself to its own specialty, plus final assembly and testing of components.

Through experience, some of it admittedly costly, Diversey has developed a sort of missile hardware team in the Chicago area. It has reliable sources for the types of work it doesn't do itself.

Manages The Team—However, as the team's "manager," the company specifies how each member plays the game. This extends to careful supervision of metal quality and of casting and forging practice, where necessary. And where tricky heat treating is involved, Diversey usually designs and builds the quenching fixtures.

Any would-be missile hardware firm might take still another leaf from the Diversey book. This involves thinking beyond the job at hand. The company's engineers are never content to just produce missile hardware to specifications. They feel a responsibility to help overall missile and rocket design progress if they can.

For example, C. W. Kinsley, the firm's vice president, has a program underway to acquaint alloy producers with the strength and service characteristics required in hardware items.

Costs Too High?—As he explains

it: "Aside from a few superalloy parts, most hardware items call for either 1020 or 4130 steel and 4130 is far out in front. I suppose the non-metallurgist designer has a natural tendency to play it safe and use the more expensive alloy except in the most obvious moderate-strength applications.

"We think that less expensive grades might be adequate substitutes for 4130 in many cases. So, we're asking steel producers what they think. Our talks are just exploratory, but we hope we can come up with some kind of a guide for designers, a missile-metals handbook, maybe."

Prospective missile machining shops might also ponder another Diversey idea for cutting the time and cost of hardware production. The firm recently installed two Hydrospin machines and intends to use this equipment for cold forming many of the contours which are presently machined from bulky castings and forgings.

Quick Forming Job—It won't strive for the ultimate in repetitive accuracy with this forming equipment. "It isn't worth the time it would take," Mr. Kauffmann says. "We'll just roll form parts quickly to approximately final size. Then we'll machine off the last few thousandths as we're doing now on our rough machined and heat treated pieces."

This bold willingness to tackle new problems and create new techniques to solve them seems essential to the successful production of missile hardware. It adds up to a full time job.

The business is not for the firm that just wants odd jobs to ease temporary lulls in its regular work. But it does offer a bright future for any company that comes well equipped and can move fast to keep up with quick-changing developments.

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How Iron Affects Forgeability of Copper Alloys

By C. H. Hannon—Metallurgical Engineer, Transformer Laboratories Dept., General Electric Co., Pittsfield, Mass.

A little bit of iron can produce some surprising effects in certain copper-base alloys.

Increasing amounts of it will improve the grain structure and make Cu-Ni-Si-Al alloys easier to hot forge.

But there appears to be some tie-in between iron, ingot pouring temperature and silicon.

■ Small additions of iron and lower ingot pouring temperatures will greatly improve hot forgeability of certain copper-base alloys. This fact came to light more or less as a byproduct of several research and development projects recently completed at General Electric's Transformer Laboratories.

In one of these—a study of the oxidation behavior of copper-base alloys—it proved difficult to hot forge alloys in the copper-base nickel - silicon - aluminum series which had low iron content. Trouble was also met in hot forging alloys for a study of iron's affect on stress-corrosion resistance of aluminum - modified Strenicor. Noting these similarities, an effort was made to establish the extent of iron's influence on forgeability.

The program embraced five alloys with a nominal chemistry of 4.5 pct Ni, 1.0 pct Si, 5.0 pct Al and 89.5 pct copper. Iron content was varied from 0.10 pct to 0.25 pct, 0.50 pct, 0.75 pct and 1.0 pct Fe.

Two Types of Molds—The alloys were melted in a clay-graphite crucible and gas-fired furnace, then

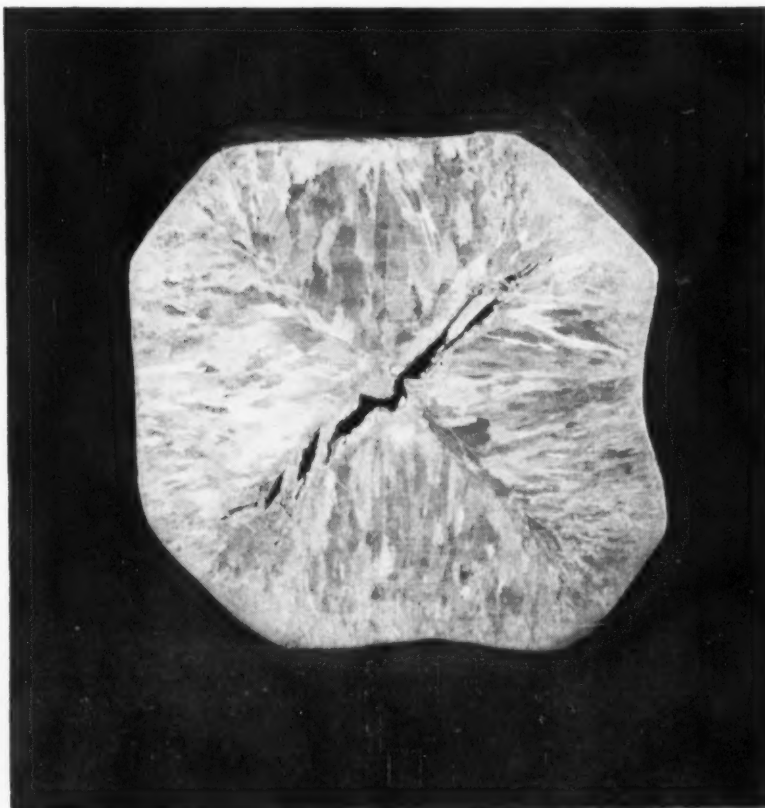


Fig. 1: Hot forging produced diagonal cracks that follow the dendritic solidification pattern in ingots having low iron content.

cast in either graphite or cast-iron molds. Refractory hot tops were used to produce sound ingots. The graphite molds were round (2 in. diam), while those of cast iron were big-end-up and fluted on four sides. With the exception of a few melts where definite temperature measurements were made, the alloys were poured at estimated temperatures.

The criterion of forgeability was the amount of cracking in a practical attempt to hot forge the ingots to

3/4-in. diam rod. In all cases, the temperature to which the ingots were heated prior to forging was estimated visually. A mechanical trip hammer was used in all forging trials; a few pressing or flattening tests on horizontal cylinders and cone shaped pieces were made with a steam hammer.

A variable was introduced in cooling of the cast ingots. Under one set of conditions, they were cooled normally in air; in another



0.10%



0.30%



0.37%



0.60%



0.70%

Fig. 2: Effect of iron in copper-base Ni-Si-Al alloy is demonstrated by etched cross-sections of ingots containing varied amounts of iron. The first two samples with lowest iron content exhibit pronounced diagonal dendrites—the type of structure that produced cracks during hot forging. As iron content increases, the dendrites begin to give way to equiaxed crystals at the center, reducing the tendency to crack. No fractures developed with more than 0.30 pct Fe, and ingots having 0.60 to 0.70 pct proved easiest to forge.

trial they were water-quenched right after solidification. A third condition evaluated was heat treatment of ingots before forging.

Low-Iron Ingots Crack—All but the ingots containing 0.10 pct Fe were successfully hot forged to 3/4-in. diam rod. The low-iron ingots cracked internally with diagonal fractures following the dendritic solidification pattern. This type failure, shown in Fig. 1, occurred during attempts to forge at least eight ingots of low iron content. In no case did cracking develop in ingots containing more than 0.30 pct Fe.

The etched cross-sections of ingots shown in Fig. 2 point up a general correlation between iron content and degree of dendritic structure. The lowest iron ingot

has the most pronounced dendritic pattern. With increasing iron the dendritic structure is lessened by random, more-nearly equiaxed crystals in the center of the ingot. The best structure for successful forging is that which lacks pronounced diagonal dendrites—the one containing 0.70 pct Fe.

The importance of pouring temperature on the as-cast structure of copper-base alloys is confirmed by the cross-sections shown in Fig. 3 of ingots poured at recorded temperatures of 1100°, 1180°, and 1375°C. (2012°, 2156° and 2510°F). These temperatures are not the precise values, but the order of magnitude is correct.

Favor Low Temperature—The best forging structure in the relatively low-iron ingots was obtained

at the lowest pouring temperature. The marked dendritic structure shows up again in the ingot poured at 1375°C.

In one phase of the project, when graphite molds were used to cast 2-in. diam ingots, a lesser tendency to crack in subsequent hot working was observed. Cone-shaped bottoms of such ingots, flattened as in Fig. 4 with a steam hammer, showed no evidence of splitting.

Similarly, the cylindrical sections of these ingots were hot forged without casualty on a steam hammer by applying unidirectional blows to effect horizontal flattening. The outcome of attempts to hot forge cylindrical ingots to 3/4-in. diam rod was not consistent.

Modifications of ingot cooling rates, ranging from water quench-

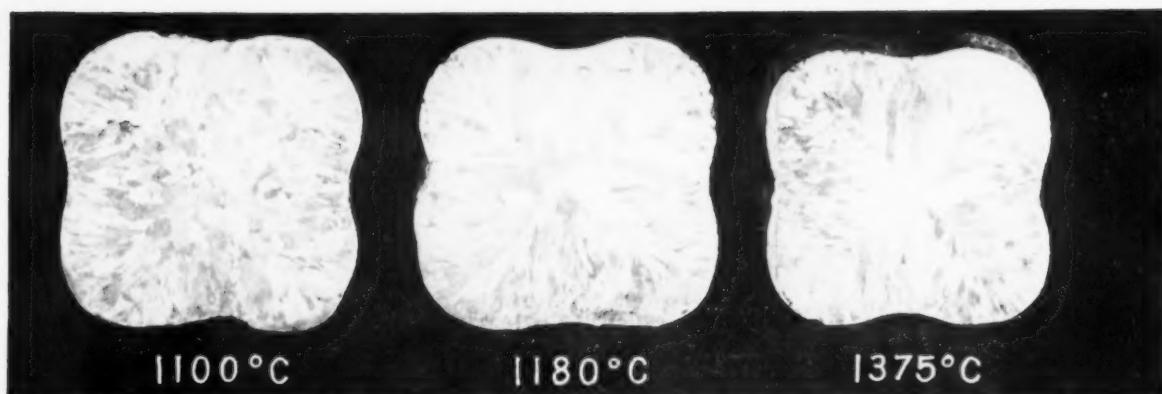


FIG. 3: Lower ingot pouring temperatures produce the most favorable structures for hot forging; diagonal

dendrites start showing up in the middle sample and become marked in the one poured at 1375°C.



FIG. 4: Cone-shaped ends cut from ingots poured in round graphite molds were flattened with a steam hammer.

Despite the severe working, none of the flattened cones showed any evidence of splitting.

ing right after solidification to slow air cooling, as well as prolonged heat treatments (6 hours at 900°C) followed by water quenching were tried. None of these gave consistent or conclusive results. It was only after a critical review of the complete practice of melting, pouring and forging that the great importance of pouring temperature was confirmed.

Silicon Affects Forging—Part of a broad study to evaluate the quantitative oxidation behavior of copper-base alloys was concerned with melting, pouring and forging copper-nickel-silicon alloys containing varied amounts of aluminum. Two of the series differed only in the presence or absence of 1.0 pct Si in a basic analysis of 4.5 pct Ni,

1 to 10 pct Al and copper the essential balance.

All of the alloys in the series containing 1.0 pct Si displayed erratic but usually poor forgeability. Contrarily, the alloys having no silicon were forged without difficulty.

Bringing all these factors together, it's evident first that the cast structure of the copper-nickel-silicon-aluminum alloy studied may be modified by two factors: pouring temperature and iron content. Additions of iron in a range of 0.30 to 0.70 pct have been found to improve hot forgeability. High pouring temperature on the other hand, produces a less-desirable ingot structure, which in turn may be correlated with poor forgeability.

Neither alone seems to be the all-important factor; rather, they

appear to compliment each other in the control of a cast structure which may be readily hot forged. Ingot cooling rate has less effect than composition and low pouring temperature on forging behavior.

It is suggested that the offending element in the composition investigated is silicon: that the beneficial effect of iron may result from the formation of a complex compound involving silicon and iron segregated at the grain boundaries. To date, however, no study has been initiated to substantiate this theory.

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Diffusion Process Makes Plain Carbon Sheet Stainless

There are countless instances where solid stainless steel sheet is used solely for its resistant surface — applications in which low-cost carbon steel would otherwise do as well.

Now you can have both: an inexpensive base metal with high-chrome protection.

■ It's no longer necessary to pay for solid stainless steel sheet when the corrosion and heat-resistant properties of stainless are needed only at the surface. Chromalloy

Corp., White Plains, N. Y., has come up with a stainless-surfaced SAE 1010 steel; one that withstands operating temperatures of 1500°F for hundreds of hours and 1200°F indefinitely. And Chromalloy-Stainless, as it's called, will cost one-third to two-thirds less than solid stainless sheet.

The stainless surface is achieved by a patented chromizing method called Chromallizing, a means of diffusing chromium into the surface of steel at high temperatures. The resulting iron and chromium atom exchange creates a surface integral

with the base metal, and equivalent in corrosion resistance to the 430 series stainless steels.

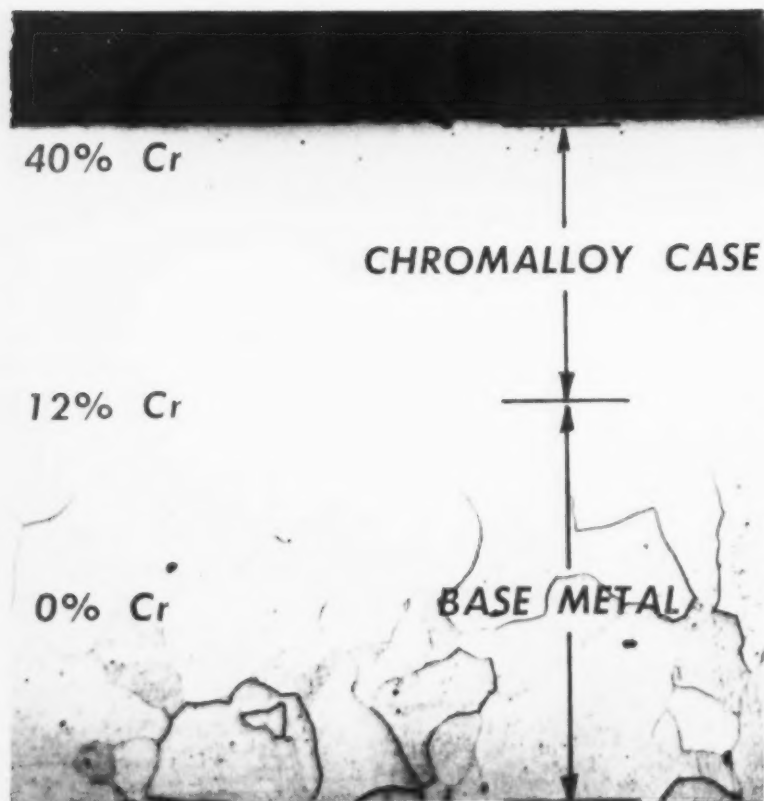
Since the high temperature treatment is followed by slow cooling, the sheet becomes fully annealed at the same time. Easily worked Chromalloy-Stainless can be bent, drawn, spun, staked, formed or welded; and the ductile surface will not spall, peel or crack.

Finds Many Uses—Chromalloy Corp. has been applying the process for some years to custom Chromallizing of parts used in the aviation, appliance, equipment, communications and electrical fields.

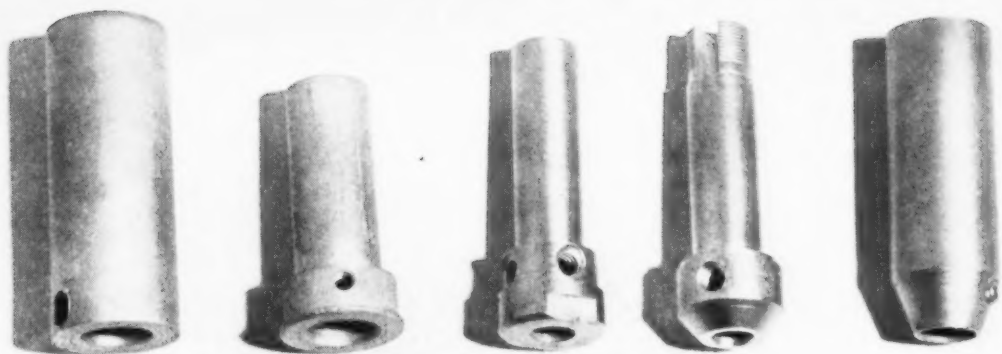
As an example, heater cores for Vulcan Electric Co. soldering irons formerly made of bronze have given way to Chromallized mild steel. Heat conductivity of the latter is superior to stainless and equal to that of the more expensive bronze cores. General Electric is using Chromallized steel sheathing on electric strip-heater casings which operate at temperatures 450°F higher than plain steel.

A small aircraft instrument armature made by Minneapolis-Honeywell is Chromallized to provide corrosion resistance. Plating was originally considered, but rejected because it interfered with magnetic properties of the part. Chromallizing does not. Teleflex Inc. uses Chromallized low-alloy steel for an aircraft engine control which involves a pair of telescoping tubes. Former tubes made of stainless became inoperative after 10 to 430 cycles at 900-1000°F. Chromallized tubes withstand 100,000 cycles at the same temperature.

Works on Moly—Wright Aeronautical Div., Curtiss-Wright Corp., is experimenting with molybdenum



INTEGRAL SKIN: Stainless surface is created by packing SAE 1010 steel in gas-tight retorts and exposing it to chromium-containing chemicals at high temperatures.



CHEAPER AND BETTER: Chromallized mild steel soldering-iron cores cost a good bit less than the bronze

ones formerly used; yet, they provide higher heat conductivity than that of a comparable stainless steel.

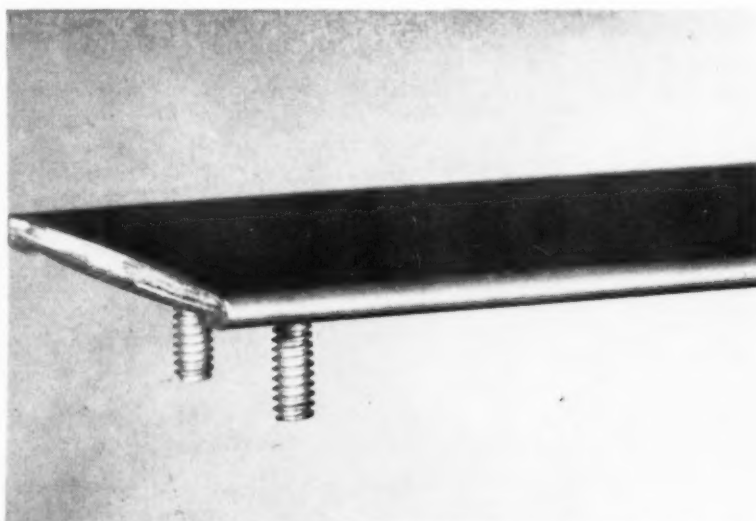
in ramjet applications because of its outstanding physical properties at high temperatures. Molybdenum, however, forms a volatile oxide at high temperatures and a reliable coating is needed. Chromallized molybdenum flame holders have shown excellent oxidation resistance.

Both high carbon steel and powder metal parts have been Chromallized with good results. In the case of high carbon steel, chromium and carbon combine to form a chromium carbide surface which is extremely hard and wear resistant. In powder-metal parts, porosity and comparatively low strength are overcome by Chromallizing. It forms a corrosion- and wear-resistant, high-strength surface layer.

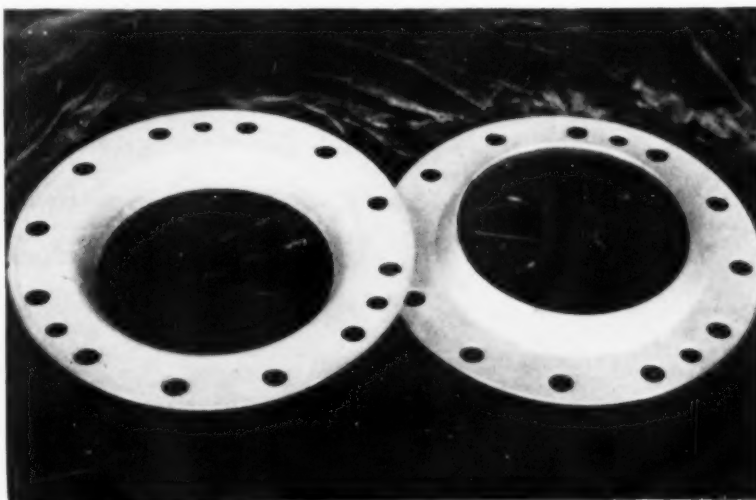
Such diversified products as relay cores, cast-iron frying pans, sewing machine needles, textile thread guides, stove broiler radiants, tools, inserts for die castings, and clutch discs have been treated.

Often the selection of a structural material is a compromise between many requirements. Here is where the process may be of particular advantage, making it possible to select a material whose physical properties meet the requirement but whose oxidation and corrosion resistance are otherwise inadequate.

The new Chromalloy - Stainless sheet is initially being made in sizes up to 2 x 5 ft and in thicknesses ranging from 16 to 24 gage.



HEAT-CORROSION RESISTANCE: Electric strip-heater sheathed in the new Chromalloy-Stainless sheet operates at 1200°F.



IMPROVES MOLY: Chromallized molybdenum flame holders reportedly reach 2500° to 3000°F in a ramjet engine now under development.

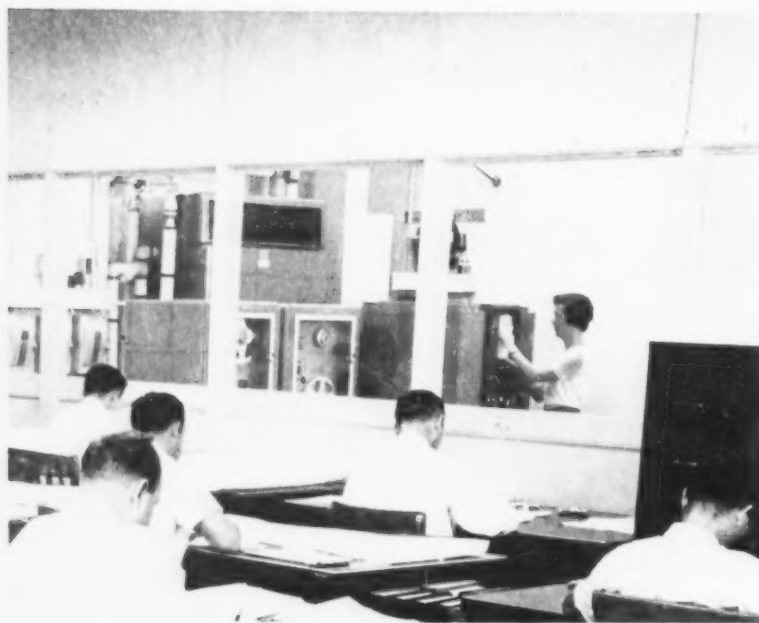
Training Program Gears Workers to Tape Control Concept

A numerically controlled machine tool is more than just another piece of equipment.

It embodies a radically new metal cutting concept, and the first one you buy will hit your plant with a heavy impact.

This impact can push you far ahead if you plan properly for numerical control. Here's how The Martin Co. did it.

■ Getting ready for the arrival of your first numerically-controlled machine tool is as important as your original decision to buy it. Just remember that the influence of this by-the-numbers concept will be felt by many people and in many ways. You cannot over-estimate its impact.



SEPARATE QUARTERS: Numerical control planning personnel have their own office adjacent to the air conditioned tape preparation and computer room. All workers are well trained for their jobs.

It's best to assume that numerical control will cause some radical changes in your plant. That's because it affects practically every operation necessary to transform an idea into a design and ultimately into a machined part.

The Baltimore Div. of The Martin Co. was well prepared for these changes when it installed its first three-dimensional, tape-controlled profile milling machine in June of this year.

A Year of Study—According to Mr. L. E. Laux, Martin's chief of research and development, an indoctrination program was set up a year ahead for all personnel who would either be operating the new machine or processing materials for it.

This program involved: (1) defining what was to be done in each

processing step; (2) selecting qualified personnel for materials processing and for equipment operation and maintenance; (3) providing specialized training in computer technology and operation.

Knowing that most of its machine tools would still be controlled either manually or by templates for some time to come, the company had to plan for numerical control as an "extra."

Changed Techniques—This meant that conventional engineering drawings could not be abolished. However, the system of dimensioning drawings was altered to permit translating dimensions into numerical control data more rapidly.

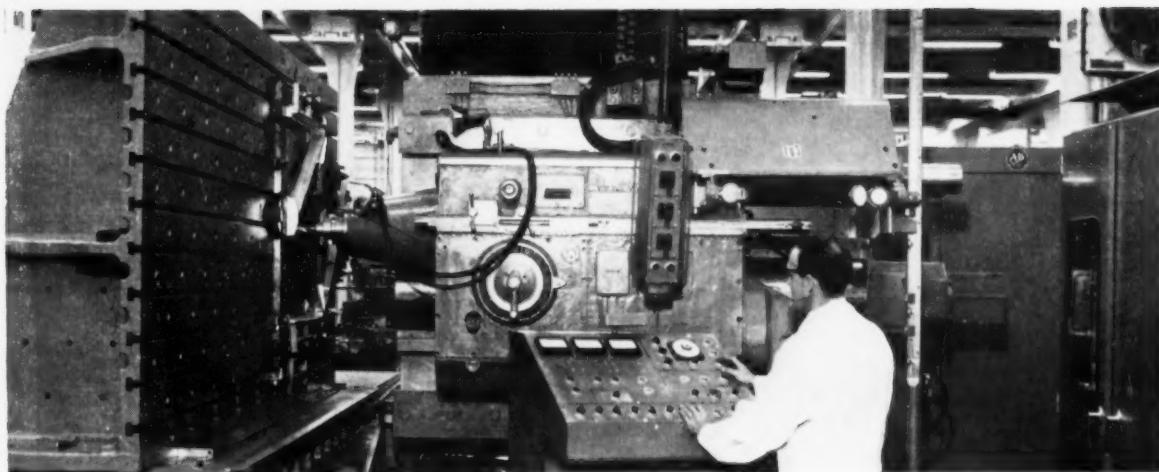
The company's experience to date indicates that the key man in the numerical control setup is the manufacturing pre-planner. Having a good knowledge of manufacturing methods, machinery and metal cutting techniques, he establishes the effectiveness of the entire numerical control system.

Routine Steps—Once the basic numerical plan is established for a particular part, the steps to transform the plan into a machine control tape are fairly routine. They consist of:

1. Preparing a write-up or manufacturing plan which describes, in detail, all conventional as well as numerically controlled machining operations and instructions.

2. Preparing a numerical control drawing. This is a pictorial representation of the part, showing, in lieu of dimensions, the path of the cutter and the sequence of cuts.

3. Preparing a process sheet which contains machining data in numerical code.



IN ACTION: Tape controlled machine mills aircraft component in three dimensions in one-quarter of the

time formerly required. Speeds and feeds have been boosted beyond original estimates.



ALL DONE: Bulkhead fitting which has been profile-milled by numerical control gets a final dimension

check and approval of tape. Workpiece accuracy requires firm clamping and machine alignment.

4. Preparing a paper process tape by Flexowriter typing the coded data on the process sheet.

5. Retyping for verification of the original process tape.

6. Feeding the process tape data through the computer and punching of the actual machine control tape.

Special Tape Room — Martin handles all tape preparation in an air-conditioned, humidity-controlled room in the manufacturing engineering office. Only the machine control tape, the write-up and the numerical control drawing go to the machine shop. All other data

are filed in the manufacturing engineering office for future use.

By having a trained manufacturing pre-planner, routine tape-preparation methods, and a special tape-preparation office all ready to go at the end of the indoctrination period, the company wasted no time when the new milling machine finally arrived. The first trial cut was made just three weeks after delivery.

During the next two weeks the machine went through a series of acceptance tests devised by Martin engineers. These comprehensive trials checked out both the machine

and its control unit for accuracy, repeatability and dependability. Moreover, the trials turned up several important clues to more efficient operation.

Keep Tools Rigid—One was that the slightest lack of rigidity in the tools reduced the degree of machining accuracy. In conventional machining, you can handle this by grinding tapers on cutters, adding more fixture clamps, or making trial runs to compensate for or correct discrepancies.

"None of these things is practical with numerical control," Mr. Laux says, "Once the tape is

Martin engineers learned quickly that it saves time to position fixture clamps at the start of the job so they provide maximum rigidity and minimum cutter interference. This permits the use of heavier cuts and faster feeds without sacrificing tool rigidity.

trolled machining. Between 30 and 60 minutes are spent at the start of each day in running test tapes which bring all phases of the control unit into play. Other checks determine if any electronic components are on the point of failure.

until all settling of the machine foundation has ceased.

Back to Zero—This means that the spindle returns to the reference point between cutting operations. It involves some non-cutting time, but the firm intends to keep programming this way until it has more tape-making experience.

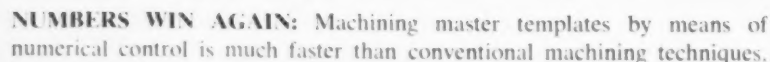
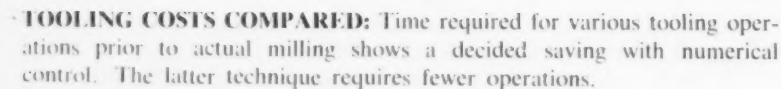
Despite some difficulty with the first tape, the company nevertheless cut rough machining time on an aircraft bulkhead fitting to 25 pct of that required by conventional methods. In addition, everyone associated with the project gained a wealth of experience.

Some of this newly acquired knowledge has already been put to good use. For example, a method was perfected for taking engineering master-lines formulas and programming them on tape for machining templates. These parts are then used to scribe the required lines on loft templates. Costly manhours of work are saved and scribing accuracy is improved.

"To us, at this point, the potentialities of numerical control seem limitless," Mr. Laux says.

"But the job has only begun," he adds. "The indoctrination of all people concerned with this new system must be broadened and made more comprehensive. The potentialities of numerical control can be realized only if we train people to think in terms of numerical control. From this point on, Mr. Laux emphasizes that the thinking must become bolder and more imaginative.

Reprints of this article are available as long as the supply lasts. You may obtain a copy from Reader Service Dept., THE IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.



Solder Aluminum Without Flux

The first question asked is how does the solder get through the tough oxide.

The answer is in the makeup of the solder. You don't even have to clean oil from the surface.

■ A simple and effective technique for soldering aluminum and its alloys, as well as galvanized metals, employs an inexpensive and stable zinc base alloy as the preferred solder. It does the job without flux or vigorous abrasion.

Joints in aluminum by this method are stronger than commercial aluminum itself. It's a result of

work done by G. M. Bouton and P. R. White, metallurgists at Bell Telephone Laboratories, New York.

Long Term Stability—The rigid exclusion of such elements as lead, tin, bismuth, and cadmium from the high purity alloy prevents intergranular corrosion. A fraction of a percent of magnesium enhances stability. Up to several percent of aluminum may be included.

For both industry and home workshop, the new technique is most effective for butt and "T" joints where the surfaces are accessible to a solder stick.

It's not necessary to remove roll-

ing mill oils or surface oxide. With a single stroke of the solder stick across the heated aluminum surface, the solder penetrates the oxide and wets the aluminum.

Oxide Lifts Off—The normally tenacious oxide film lifts off much like paint peeling from wet wood. The raised oxide coating wipes away.

The wetted surfaces can be joined by bringing them together and adding more solder to the heated pieces. Heat may be applied electrically or with torches burning common fuels.

The technique is equally effective for joining galvanized surfaces without a flux.



SOLDER WETS (above): Dark area around bead of solder defines where solder has alloyed with aluminum through oxide.

SIMPLIFIES JOINING (left): G. M. Bouton, codeveloper of process, demonstrates how to make strong stable bond.

Prevent Lighting-Off Explosions With Safety Controls

By J. B. Smith—Chief Engineer, Engineering Div., Associated Factory Mutual Fire Insurance Companies.

A well-trained operator who'll strictly follow the right lighting procedure may be safeguard enough.

But if just one burner cock on a gas-fired furnace, oven or boiler is left open, an explosion is almost certain to result.

This new control system makes the fireman remember.

■ A recent study of 83 fuel explosions at heat-treat furnaces over a 10-year period showed that 40 occurred during lighting-off. Of the 40, at least 25 were caused by one or more burner cocks being accidentally left open when the main gas valve was turned on. And because they resulted from human errors, all of these accidents were preventable.

In an effort to eliminate the main cause of such explosions, a gas safety control system has been developed by the Engineering Div. Laboratories, Associated Factory Mutual Fire Insurance Companies. Currently in use in many plants, it provides a simple, efficient safeguard against premature admission of gas to open burner cocks.

One type of FM cock system is designed around three principal units: a special cock, a checking pressure switch and an electric safety shutoff valve on the main gas line.

Side Ports Are Key—The FM cock is similar to normal gas cocks, except that it has two side outlets, as shown in Fig. 1. The outlets provide a small independent passage-way that's open only after the main

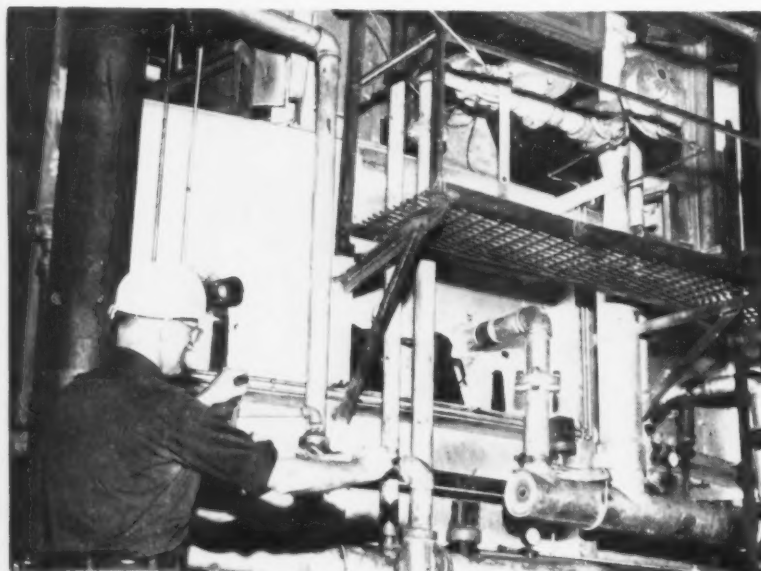
gas passage is completely closed. Gas can flow through the side outlets or to the burners, but not both.

This feature is important. It's the gas or compressed air flowing through the side ports that furnishes pressure to energize the valve on the main gas line. This energizing force can't reach the switch unless all burner cocks are turned off, so it's impossible to open the main gas valve unless all burner cocks are fully closed.

Cocks of this type are available from several sources. In sizes up to 2 in., Factory Mutual approved cocks are made by D. T. Williams Valve Co., Cincinnati, and W. J. Schoenberger Co., Cleveland. Sizes from 2½ to 6 in. are offered in the Nordstrom lubricated plug-cock line made by Rockwell Mfg. Co., Pittsburgh. All are suitable for manufactured, natural, propane and butane gases.

Joined in Series—The side ports of all cocks are connected in series with copper tubing. In applications where gas is used as the checking medium, one end of the tubing line is connected to the main gas line on the upstream side of the main shutoff valve; the other end goes to the checking pressure switch.

In lighting off, the operator first turns gas into the small tubing connecting the cock side-ports. If all cocks are fully closed, as they should be, gas flows through them by way of the side ports and operates the checking pressure switch. This energizes the electric safety shutoff valve on the main gas line so the operator can open it by hand.



AVERTS ACCIDENT: Proper lighting procedure is assured when furnace or oven is equipped with the new FM safety control system.

As soon as the electric valve is opened, gas flows into the burner piping and operates a low-pressure switch that "shunts out" the checking switch. This second switch keeps the electric valve from closing when individual cocks are opened to light the burners. It also furnishes protection in case of gas-pressure failure, tripping the main safety shutoff valve if pressure becomes dangerously low.

Air-Actuated, Too—In a combustion air blower system the checking switch is operated by air pressure. A third pressure switch, located as in Fig. 2, protects against failure of combustion air pressure and assures that the blower will be started in proper sequence when lighting-off.

Where automatic temperature control is by high-low or modulating zone-control valves in the gas piping, there's usually a shutoff cock on both sides of each control valve to permit its removal for repairs. There is also a valved bypass around each control valve so the other burners can operate while one is down.

Such installations require a per-

manent flame bypass around the valve in the bypass line, or an additional pressure switch downstream of the zone-control valve. Contacts of these low-pressure switches should be wired in series.

Added Safeguard — Occasionally on new multiburner equipment and more often on older furnaces and ovens, temperature is automatically maintained by zone-control valves firing on-off with a continuous pilot at each burner. When such equipment is shut down, pressure trapped between the closed main safety shutoff valve and closed zone-control valves would hold the low-gas-pressure switch closed; this would keep the main safety shutoff valve energized, so it could be reopened even while some of the burner cocks are open.

This bypassing of the safety checking system can be prevented by a small solenoid valve that opens automatically and bleeds pressure from the piping when the main safety shutoff valve is turned off.

A more recent development is the electric FM cock—basically, a two-way lubricated plug cock with a special supervisory switch whose

contacts are closed only when the cock is closed. The Fireye FM Supervisory cock, as it's called, comes in 3/4 to 6 in. sizes, and is available from Combustion Control Div., Electronics Corp. of America, Cambridge, Mass. Similar in application to the pneumatic FM cock, it may be used for oil as well as gas burners.

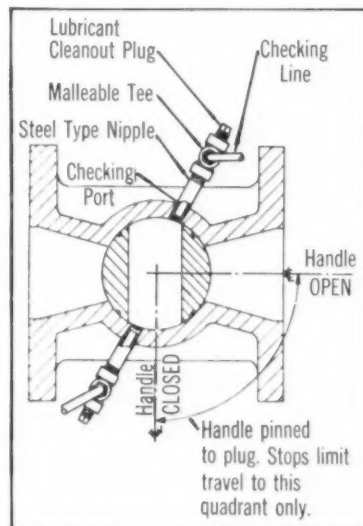


FIG. 1: Safety control cock must be closed for gas to flow through side ports and make the pressure-energized main valve operable.

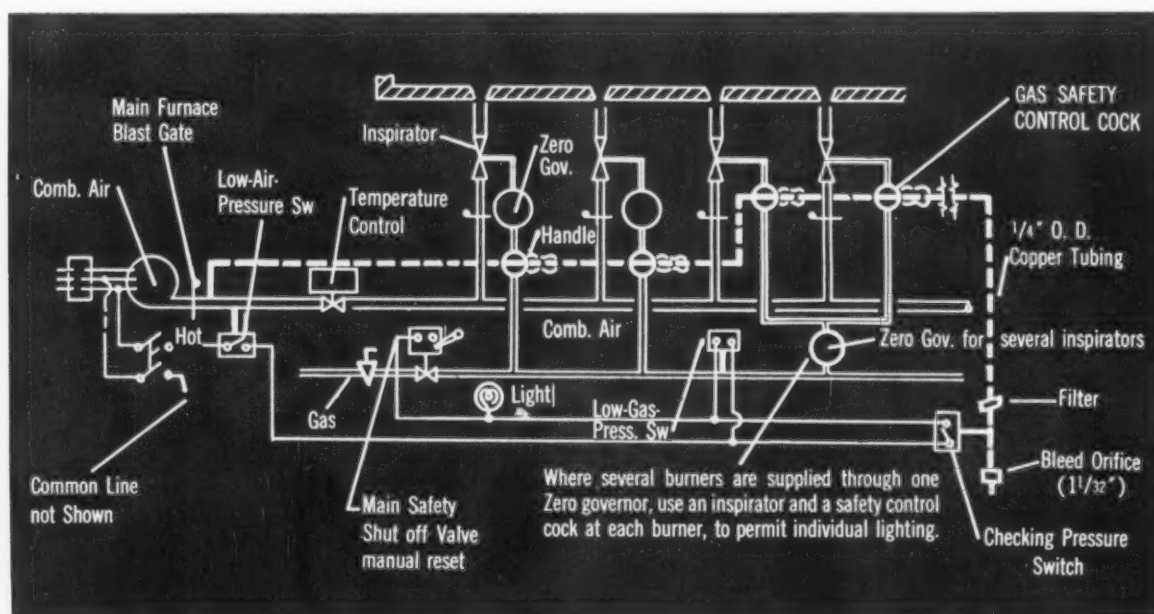


FIG. 2: Extra switch in combustion blower system guards against air-pressure failure, makes certain blow-

er starts in proper sequence when lighting off. The low-pressure switch should be in the burner gas piping.

Liquid Adhesive Bonds Steel

One drop of adhesive forms a quick-setting high strength bond. The secret lies in the fast action of polymerization.

Initial tests show promising uses in bonding many materials.

■ A technician found he couldn't separate the glass prisms of a refractometer. The sample he was testing had formed a high strength bond.

This unexpected result at the research laboratories of Tennessee Eastman, Div. of Eastman Kodak Co., Kingsport, Tenn., led to the development of a new liquid adhesive, Eastman 910. Its combination of rapid set-time and high strength promises wide-spread application in industrial design.

Test Demonstrates—Place one drop of the colorless liquid on the end of a 2-in. diam steel rod. Press the end of a similar rod against this

surface and hold for a few seconds.

With eye bolts attached to ends, place assembly between a crane hook and a lifting harness. Within 5 minutes, the one drop supports the weight of a 200-lb man.

Bonding forces between the molecules within the drop develop rapidly. Within 30 minutes, the bond supports a 5000-lb. automobile. If permitted to set for 48 hours, the bond would hold the weight of three cars.

No Outside Help—The process requires no heat, pressure, evaporation of solvent or long curing time. The adhesive action results from polymerization of a cyanoacrylate monomer. It works well with a variety of materials including metals, glass, wood, ceramics, rubber, and plastics. Among the metals tested, combinations of steel, aluminum, copper, magnesium, bronze, and brass can be bonded effectively.

The speed of setting depends on

the nature of materials. Tests show glass-to-glass bonds to be unbreakable within 5 to 15 seconds.

Wood-to-wood bonds take 3 to 5 minutes to set and only 2 to 3 hours before the bond can take rough handling. Steel-to-steel bonds set in 15 to 20 seconds, develop 2000 psi tensile strength within 30 minutes and 5000 psi after 48 hours. A cure of several weeks increases tensile strength slightly.

Some Limitations—Exposure to temperatures above 212°F for more than 24 hours or exposure to water at temperatures near boiling point will destroy the bond. Below 170°F, prolonged exposure to water will temporarily weaken the bond.

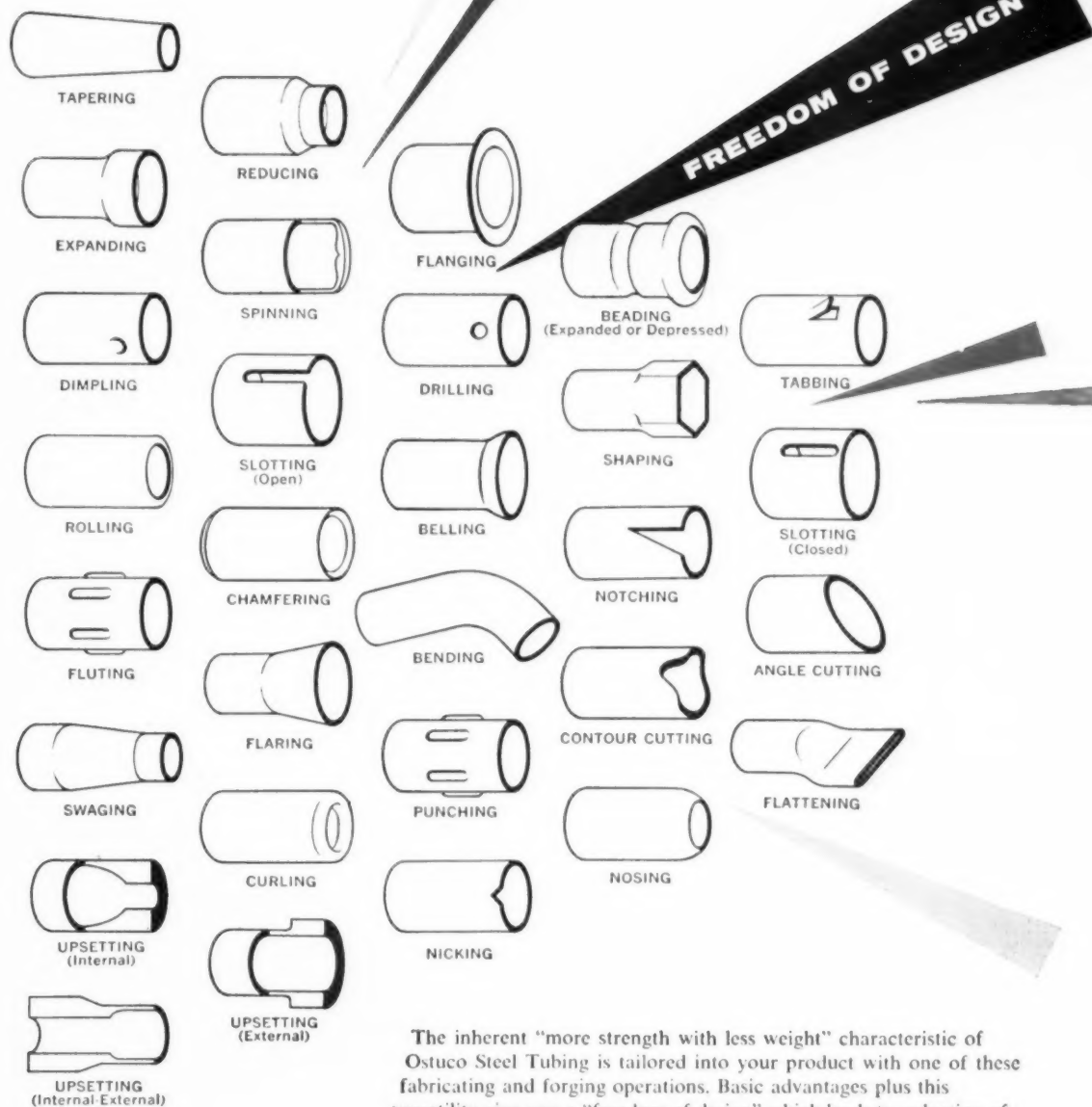
Applications for the adhesive will develop where extreme speed of setting and curing is needed; where there is a necessity for bonding materials not responding to conventional adhesives; and where there is need for high bonding strengths with small joining surfaces.



QUICK SETTING: When the two surfaces are placed together, the one drop will set the bond within half a minute.



TEST FOR STRENGTH: In one-half hour the bond between the two 2-in. steel rods supports more than 5000 lb.



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FREE TECHNICAL LITERATURE

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Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, p. 143.

Bolster Plates

Special die sets and bolster plates are featured in a 16-page booklet. It provides ordering data, dimensional charts, etc., for all-steel die sets, cast die sets and special die sets and extras. The brochure also gives data on JIC press room standards for bolster plates. (E. W. Bliss Co.)

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Steam Cleaners

Three direct-fired steam cleaners are described in a 4-page bulletin. (Kelite Corp.)

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Semi-conductor Solder

Semi-conductor soldering applications are analyzed on a handy reference chart. It offers phase diagrams for several soldering alloys used in semi-conductors. In addition, a list of high-purity elements is included. (Anchor Metal Co., Inc.)

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Tubular Products

Tubular products' use at elevated temperatures and pressures are discussed in a 4-page bulletin. It presents stress rupture data on a num-

ber of tubing steels used under such conditions. The folder also furnishes results of stress rupture tests on 14 steels including carbon steel, several alloy steels and ten different stainless steels. Testing temperatures range from 850 to 1800°F. (Tubular Products Div., Babcock & Wilcox Co.)

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Blast Controls

Concise data on packaged instrumentation for sequence control of hot blast temperature in blast furnaces is presented in a data sheet. (Leeds & Northrup Co.)

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Master Switch

A product sheet introduces a new general-duty (i.e., cranes, conveyors) electrical master switch. (General Electric Co.)

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Photo-forming

Photo-forming of metal parts is discussed in a bulletin. Two processes are mentioned—chemical etching and electrolytic etching. (Superior Tube Co.)

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Heavy-duty Switch

An 8-page bulletin gives data on a heavy-duty master switch. (General Electric Co.)

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Blast Cleaning

Hand operated, blast cleaning machines are reviewed in a bulletin.

These units perform maintenance cleaning, ornamental etching and carving, foundry work, exterior cleaning, etc. The 28-page publication describes methods of applying abrasives from nozzle blast cleaners. It also covers applications of both wet and soft abrasives. (Pangborn Corp.)

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Materials handling

How modern handling equipment helped several users is told in a case-study folder. (Lewis-Shepard Products, Inc.)

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Motors

Climatized vertical hollow shaft motors are subjects of a 4-page bulletin. These open drip-proof motors are for shallow and deep-well turbine pump applications. They come in NEMA frames 364 to 505. (The Louis Allis Co.)

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Works Sheet Metal

For sheet metal use, a power grooving machine features pushbutton controls and a gearhead motor drive. A 4-page bulletin describes not only this unit, but also universal and hand-operated groovers. (Niagara Machine & Tool Works.)

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Power Reactors

Saturable power reactors are discussed in a bulletin. The 32-page guide covers uses, turn down characteristics and application of automatic control to these units. (Barber-Colman Co.)

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Better Welds

"How to Get Better Welds" is a completely revised edition of a company's well-known vest pocket guide. Containing 60 pages of useful arc welding information, it describes: metals and electrodes, proper procedures, fillet welds,



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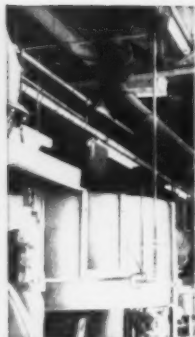


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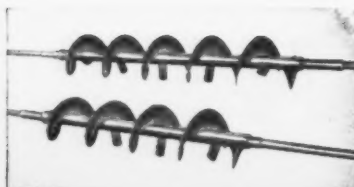
Atlas Neoprene Coatings

If yours is a typical plant involved in everyday processing operations, chances are that plant structures and equipment are subjected to continuous corrosive attack.

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FREE LITERATURE

joint types, typical positions, symbols, causes of trouble and what to do about them, welding terms, weight of metal deposit, grinding spark tests, selecting electrodes, explanation of AWS classification numbers and comparative index of welding electrodes. (Hobart Bros. Co.)

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Tractor Maintenance

Good machine performance usually ties-in with proper operator care of the unit. So a tractor maker wants operators to keep up on latest maintenance facts. A 24-page guide lists quite a few hints and suggestions. (Caterpillar Tractor Co.)

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Backhoe Tractor

Design and performance characteristics of a hydraulic backhoe are outlined in a publication. The mobile excavating unit is built in to a Caterpillar tractor. (Hyster Co.)

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Ammonia Use

Up-to-date facts on handling, care, economy and use of anhydrous ammonia appears in a new handbook. (Nitrogen Div., Allied Chemical & Die Corp.)

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Titanium

Titanium production is discussed in a booklet. The first of a series on titanium, the booklet covers properties and uses, too. (Republic Steel Corp.)

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Work Gloves

Coated fabric work gloves are featured in a catalog. It lists and describes six different lines, each for different applications. (The Granet Corp.)

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"This used to take hours...

now the whole gearcase comes off in minutes!" Quite an accomplishment for an enclosed eccentric press. Too often the advantages of the enclosed design are gained by sacrificing the accessibility of the open design. Not so with Bliss, however: Bliss engineers count practical maintenance a design "must"—any new design that comes off the boards at Bliss keeps the maintenance man in mind.

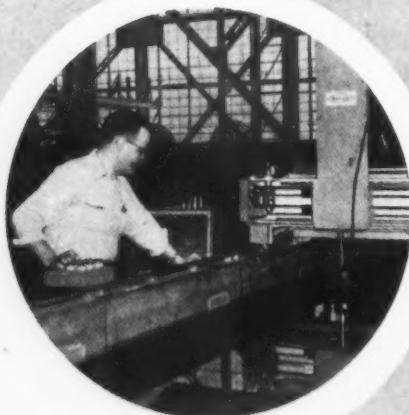
Which is one more reason why industry agrees, "Bliss is more than a name ...it's a guarantee."



E. W. BLISS COMPANY • Canton, Ohio

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PRESSES • ROLLING MILLS • MILL ROLLS • DIE SETS • CAN MACHINERY • ORDNANCE



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SPERRY'S COMPLETE RANGE OF SERVICES, FACILITIES AND EQUIPMENT COVER ALL PHASES OF ULTRASONIC TESTING. ONLY SPERRY OFFERS ALL THESE:

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Shelter Rock Road
Danbury, Connecticut

FREE LITERATURE

Continued

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

Shop Equipment

Work benches, tool stands, shelving and other pressed-steel shop equipment are shown in an 8-page catalog. It reviews one maker's more than a dozen different shop furniture categories. Also included are setups for laboratory and assembly-line use. (Standard Pressed Steel Co.)

For free copy circle No. 21 on postcard

Valves

An 8-page catalog deals with flow-type pilot valves. These valves come in five basic models: ball cam, palm button, hand lever, locking hand lever and mechanical link clevis. They are 1/4-in. pipe size units for two or three-way air operation to 150 psi. Uses include remote control of master valves, directional control of small single acting cylinders, and for shut-off. (Hanna Engineering Works.)

For free copy circle No. 22 on postcard

Spring Washers

Spring washers made from a multitude of different washer-dies are listed in a bulletin. Employing more than 1000 varying size dies, the manufacturer blanks and punches 0.125 to 4.735-in. OD spring washers. These include flat, cupped, curved, wavy, slotted, and belleville washers. (Associated Spring Corp.)

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Hole, Bore Micrometer

Now you can precisely measure the inside diameters of bores and holes with a unique measuring tool.

A 4-page bulletin describes the self-aligning internal three-point micrometer. (Brown & Sharpe Mfg. Co.)

For free copy circle No. 24 on postcard

Magnet Grapple

For handling scrap and other materials, a combination unit can be used as a magnet, a grapple or a combination magnet-grapple. It has big capacity, yet fits into a standard 8-ft truck body. A 4-page folder tells more about it. (M. P. McCaffrey, Inc.)

For free copy circle No. 25 on postcard

Industrial Doors

Many types of industrial doors are listed in a new 12-page catalog. It features technical data on steel frame doors; industrial channel frame doors; galvanized sheet steel covered doors; corrugated sheet metal doors; wood doors; steel plate doors; vertical lift doors and craneway doors. (Richards-Wilcox Mfg. Co.)

For free copy circle No. 26 on postcard

Steam Distribution

Double-tube steam distributing coils are dealt with in an 8-page bulletin. (American Blower Div., American Standard.)

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Zinc Brightener

For still and automatic plating, a new zinc brightener is introduced in a firm's reading matter. The brightener is a balanced liquid formulation. It resists break-down at high temperature, giving peak economy of operation — generally 50,000 or more ampere-hours per gallon. (R. O. Hull & Company, Inc.)

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Fasteners

With the present cost-price squeeze and inflationary pressures, cost reduction is a concern for everyone from top management down. To help management with cost cutting, a maker of pre-

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THE IRON AGE

Post Office Box 77
 Village Station
 NEW YORK 14, N. Y.

FREE LITERATURE

assembled fasteners has published a booklet asking for re-examination of the price-per-thousand purchase policy. It contains 20 pages. (For free copy, write on company letterhead to Shakerproof Div., Illinois Tool Works, St. Charles Road, Elgin, Ill.)

Micro Switches

Quiet operation; that describes a new push-button switch. Just a light touch actuates it. And loud clicks and snaps are non-existent. (Micro Switch Div., Minneapolis-Honeywell Regulator Co.)

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Angle-iron Shear

Just 26-in. high, a new angle-iron shear has an 18-ton capacity. It works with both iron and sheet metal jobs. (W. A. Whitney Mfg. Co.)

For free copy circle No. 30 on postcard

Copying Lathes

Versatility of engine lathes with the productive capacity of special purpose lathes is explained in a 14-page folder. This double usefulness is made possible by a design which allows instant changeover from engine lathe work to automatic duplication. Available in three sizes, 13, 16 and 20 in., the machine tools come in engine, toolmaker and gap types. (Lodge & Shipley Co.)

For free copy circle No. 31 on postcard

Stainless Steel

Stainless sheet and plate available from one supplier are listed in an 8-page catalog. Many types and finishes are covered. (Eastern Stainless Steel Corp.)

For free copy circle No. 32 on postcard

Heat Treating

A salt bath carburizing-martempering process used by an engine manufacturer is discussed in

new literature. It describes carburizing-martempering of crankshafts for outboard motors. (Ajax Electric Co.)

For free copy circle No. 33 on postcard

Jacket Grippers

Jacket slippage on welding cable, caused by operator tug and pull, can be eliminated with the use of jacket-grippers. These are lapped end steel bands which, when installed around the rubber jacket of a welding cable, internally bind the cable strands and cable jacket into a strong composite section. A catalog page describes them. (Tweco Products, Inc.)

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Casting Process

Mass production of quality-engineered, controlled Brinell range, high tensile strength castings is described in a publication. It illustrates the versatility of this process which allows castings ranging from 1/2 to 30 lb to be produced at up to 250 castings per hour. Mold life in this process ranges from 3000 to 100,000 units. (General Electric Co.)

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Lubricator

Description, operation and applications of a dual output lubricator are included in a 2-page technical reference. It describes a lubricator which allows for two independent lubricating systems on a single machine. One system provides continuous flow, constant pressure lubrication to certain bearings; the other gives cyclic or periodical lubrication to other bearings. (Bijur Lubricating Corp.)

For free copy circle No. 36 on postcard

Communications

Two-way loud speaking communication equipment is dealt with in a 6-page folder. Equipment includes speakers, speaker assemblies, amplifiers, microphones, telephone handsets, cables and junction boxes. (Mine Safety Appliances Co.)

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THE IRON AGE, November 7, 1957

EXTRAORDINARY BEARING PROBLEMS?

"REALI-SLIM" BALL BEARINGS



Ball radial



Angular contact



4-pt. contact

Cross sections from $\frac{1}{4}$ " to 1" and 4" to 40" bore diameters. Some sizes available from stock.

THIN SHELL NEEDLE BEARINGS

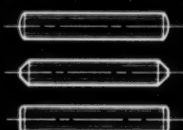
NEW!



Type KN

Standard sizes — in stock

NEEDLE ROLLERS

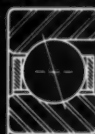


Spherical, conical or flat-end types

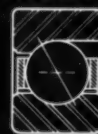
RADIAL BALL BEARINGS



Conrad design, types LC, HC and BLC

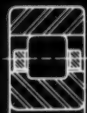


Maximum capacity design, types HM, BLM

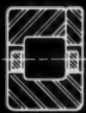


Angular contact design, types HA, BLA

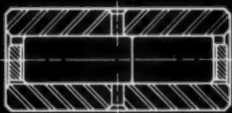
RADIAL ROLLER BEARINGS



Lipped inner, straight outer race types RN, RX and RNW



Lipped inner, one lip outer, side ring type RP

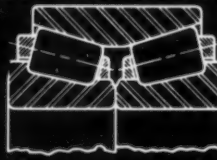


Straight inner, straight outer, mill type RM

TAPER ROLLER BEARINGS

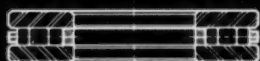


Single row type TS



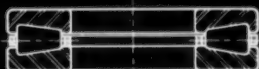
Two row, non-adjustable type TNA

THRUST ROLLER BEARINGS

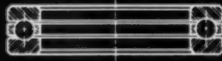


Straight roller, flat races, type RT

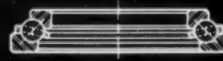
Conical roller type RIC



THRUST BALL BEARINGS

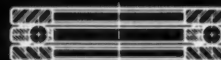


Grooved race type BT



Angular contact type BTA

Flat race type BTE



ECONOMICALLY SOLVED AT KAYDON

When bearing problems seem next to impossible — when design considerations appear insurmountable — it's time to call KAYDON.

You'll find KAYDON'S full-time, experienced bearing-design engineers can take your problem in hand — and take worries off your mind. Their

record is one of remarkable success — designing and producing bearings others said "couldn't be made."

Extraordinary bearing problems are KAYDON'S daily assignment. The tougher the better! If your designs require bearings of exceptional thrust or radial capacity, close-tolerance precision and/or "Real-Slim" section, or extra-large diameter bearings up to 130" O. D., call or write KAYDON for specific recommendations, economical solutions. You'll be glad you did.

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All types of ball and roller bearings — 4" bore to 130" outside diameter . . .


K-572

Taper Roller • Roller Thrust • Roller Radial • Bi-Angular Roller • Needle Roller • Ball Radial • Ball Thrust Bearings

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TECHNICAL BRIEFS


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CHAIN ASSEMBLIES
with all components furnished from
your distributor's stock.



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Hammerlok
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- NO WELDING
- Hammerlok is made of alloy steel... is stronger than Herc-Alloy chain... is thoroughly field tested.
- Write for literature or ask your industrial distributor about Hammerlok.
- Made by the makers of Herc-Alloy... the original alloy steel chain.

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CHICAGO • CLEVELAND
In Canada: McKinnon Columbus Chain
Limited, St. Catharines, Ontario



CM
HOISTS AND CHAIN

Blast Cleaner Setup Cuts Handling Costs

Sometimes a fabricator finds that blast cleaning is the best way to do a job. In which case, he simply takes the parts and transports them to an airblast room.

But what happens when you're turning out these items on a production line? You can't move the room to the line. Or can you?

■ An integrated dual-purpose blast cleaning installation takes care of cleaning worries for a fabricator of fan apparatus. Not only does the blast setup cut cleaning time by two-thirds, but it also substantially reduces handling time.

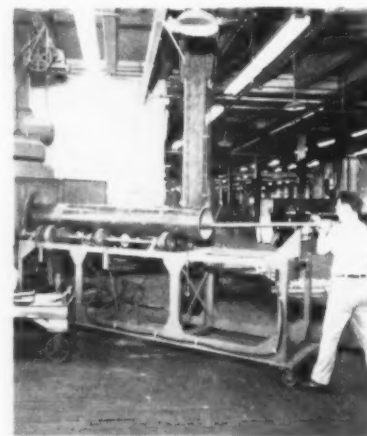
The Sturtevant Div. of Westinghouse Electric Corp., Hyde Park, Mass., specializes in manufacturing large commercial fans and blowers and component parts of field assembled air conditioning apparatus. Shells and headers of large Freon condensers for air conditioning units must be thoroughly cleaned before assembly. The condenser shells are approximately 10 ft long and vary in diameter from 12 to 20 in.

Finds Blasting Best—The company finds that airblast is the only practicable way to blast the inside surface of the shells effectively. In the past this process was performed by transporting the shells to a distant blast cleaning station and accomplishing the job in a conventional airblast room.

Now, a 6-foot table-room, manu-

factured by Pangborn Corp., Hagerstown, Md., in the process line serves the dual-purpose of automatically blasting hot rolled headers, fan components and other parts in addition to serving as a blast chamber for cleaning the inside surface of the condenser shells.

Cleans Mill Scale—When used as a standard table room, castings are loaded through a single door



As a part rotates, blaster cleans inside and outside.

which opens to expose half of the table. Cleaning of heavy mill scale is accomplished in a few minutes with premium quality chilled iron

Want More Data?

You may secure additional information on any item briefed in this section by using the reply card on page 143. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

grit. An integral dust collection and abrasive handling reclamation system ventilates the compartment and cleans the abrasive for continuous reuse.

The table-room quickly converts to a blast chamber thanks to a smaller, special abrasive-tight door with a heavy rubber curtain; this allows one end of the condenser to be inserted into the table-room. During the air blast operation the table-room is used to confine flying abrasive, provide necessary exhausting of dust and serve as an abrasive collection, separation and reclamation device.

Hoist Loads Shells — A chain hoist loads the large condenser shells onto a portable positioning device. This permits handling of bulky tubes by a single operator. After loading, one end of the shell is inserted in the table-room through the special side door. Compressed air lifts move two pairs of the small wheels up under the shell for easy roll-in.

After positioning, the rolling wheels retract to allow the shell to rest on four pairs of larger wheels in such a manner that the shells can be continuously rotated during the air blast operation. Air blast is provided by a long lance nozzle which projects the abrasive at an angle of approximately 45°.

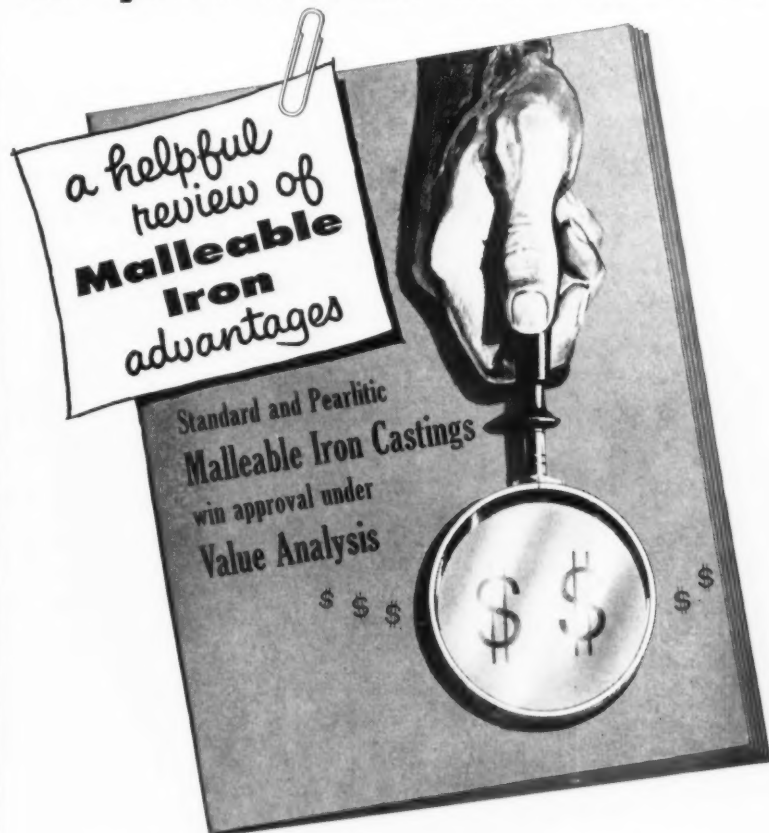
Where it previously required 30 to 35 minutes of actual cleaning time in an airblast room it now takes about 10 minutes to clean the interior surface of an average size condenser shell.

Rapidly Produces Tube

Commercial aluminum tubing rolls off a new mill line at 260 fpm. It comes off in finished condition for use in television antennas, outdoor furniture, etc.

In use at JFD Electronics Corp., Brooklyn, the 2½-in. capacity tube mill immediately adapts to turn out tubing from different metals. No adjustment to the mill itself is necessary for this, except for regulation of speed to suit welding re-

For your metals data file . . .



Send for this informative brochure!

Whether your approach to selection and purchasing is "Value Analysis", "Purchasing Research", "Cost Reduction Buying"—or just plain "wise buying", the need for background information on materials is apparent to both designers and purchasing people.

How about Malleable?



This new publication—"Standard and Pearlitic Malleable Iron Castings win approval under Value Analysis"—is now available to you. It shows you how the use of Malleable will pay big dividends. Just write for the "Value Analysis brochure".

Consult a malleable foundry engineer at the drawing board stage



1800 Union Commerce Building

Cleveland 14, Ohio

TECHNICAL BRIEFS

quirements of various type metals. In fact, the user reports good results in using the mill in producing brass-coated steel tubing.

Mostly Aluminum Work—Current production, however, is mainly aluminum 1-in. OD tubing (also 1-in. square tubing). These come in wall thicknesses from 0.025 to

0.050 in. Material is 3S and 4S aluminum from $\frac{3}{4}$ to full hard. Tube lengths are 16 x 33 ft.

Abbey Etna Machine Co., Perrysburg, Ohio, manufactured the mill.

Maintenance Men Build Miller From Planer

By converting a 48 x 48-in. x 16-ft open-side planer, maintenance

men at one plant have produced a three-dimensional, tracer-controlled milling machine. This gives them a custom-made unit especially designed to do the firm's own work.

In use at the Torrance, Calif., plant of National Supply Co., the machine's movements have been changed to all-hydraulic operation. A 25-hp hydraulically - powered, variable-speed spindle replaced the planer tool-mount.

Spindle Speeds Vary Widely—

Spindle speeds can be varied from 60 to 3000 rpm with two geared speed ranges. Vertical travel of the milling head is 8 in., provided by two hydraulic cylinders on opposite sides of the spindle housing. The milling head can be swiveled 45° each side of the vertical. Feed rates for all movements range from 0 to 25 ipm.



A three-directional tracer valve over a template mounting table at the operator's station is positioned about 48 in. from the spindle center line on an arm that extends across the table from the spindle housing. The 40 x 60-in. template mounting table is an extension shelf attached to the outboard side of the table. It may be positioned at any point along the 16-ft work table.

Uses Hydraulic Power—Hydraulic power for machine movements and spindle rotation is provided by a 30-hp combination hydraulic power unit. This works with a 20 gpm variable delivery pump to the spindle and a dual pump of 11 gpm capacity for table rapid traverse and 11 gpm for three-directional feed movements.

Cross and vertical rapid-traverse are accomplished by opening the tracer valve for maximum feed. A pendant control is used for spindle start and stop and for table rapid traverse—forward and reverse. For long, straight cuts a unique mechanism deflects the stylus in the desired direction of feed and frees the operator of stylus manipulation.

First job on the machine required removal of 7000 lb of metal from a 9800-lb steel forging. This was done

NEW!



Now equipped with a new and larger Onan 12.9 hp engine, the new Miller AEA-200-L produces a full 225 amperes of continuous rated, high cycle welding current or, 5 KW of 110/220 ac power for operation of power tools, lights, milking machines, etc., or, 1 KW of dc power.

Contractors, job weldors, farmers and many industries have shown a continuing high regard for the AEA's weatherproof ruggedness, easy portability and instant changeover versatility from ac welder to power plant to pipe thawer.

Readi-pull starter, rubber tire running gear and road trailer available as optional equipment.

Complete specifications sent on request.

... If it's Miller you know it's the finest ...

Miller Electric Manufacturing Company, Inc.

APPLETON, WISCONSIN

distributed in Canada by CANADIAN LIQUID AIR CO., LTD., Montreal

Announcing...

Two new

Titanium alloys

for high temperature

applications



MST 821... *the highest strength weldable sheet & bar alloy in 400—1000°F range*

MST 2.5Al-16V... *the first readily formable, heat treatable sheet alloy*

Two new alloys developed by Mallory-Sharon now extend the high temperature usefulness of titanium.

MST 821 is a weldable sheet and bar material with exceptional high temperature strength. It offers strengths equivalent to similar titanium alloys at temperatures *two hundred degrees* higher, in the 400 to 1000°F range. MST 821 is thermally stable, and has good ductility and formability.

MST 2.5Al-16V was developed in response to needs of the airframe industry for a sheet alloy which

would be soft and formable in the annealed condition, and which could be heat treated, after forming, to high strengths while retaining ductility. With this material, yield strength can be as low as 50,000 psi, to permit easy fabrication, then increased to 150,000 psi by heat treatment. Age hardened sheet has good

short-time hot strength—about 100,000 psi yield strength up to 800°F.

These alloys, now in limited commercial production, are further evidence of rapid advances in titanium. Use Mallory-Sharon's outstanding technical experience and service on your present requirements — or future plans—in titanium.

MALLORY SHARON

MALLORY-SHARON TITANIUM CORPORATION • NILES, OHIO



Producers of titanium and titanium alloy sheet, strip, plate, rod, bar, billets

TECHNICAL BRIEFS

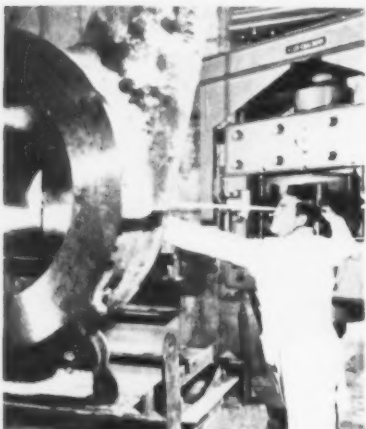
with a 10-in. carbide face mill operated at 250 rpm and 8 ipm with negligible vibration at 3/16 in. depth of cut.

X-ray Unit Penetrates 20-in. Castings Fast

For use in inspecting castings, a new 24-million volt betatron gives off X-rays at 9/10th the speed of light. It penetrates 20 in. of steel in a matter of minutes.

Now in operation at Electric Steel Foundry Co., Portland, Ore., the X-ray unit affords the company a degree of inspection not possible previously. Thus it helps turn out higher quality castings than before.

Mounts On Ceiling—The betatron, supplied by Allis Chalmers Mfg. Co., is the manufacturer's first industrial unit with a ceiling mounted, telescoping tube suspension. It



With this X-ray setup, the firm inspects castings faster.

rotates vertically and horizontally, providing 4 ft vertical and 20 ft horizontal travel.

The betatron and its controls are housed in a 25 x 60 x 21-ft concrete lined pit. A 20-ton bridge crane places castings in the pit and removes them after inspection. Automatic signals indicate when the radiological equipment is operating.

Can't Harm Workers—All portals providing ingress to the pit are

equipped with switches that shut off the equipment when the door is opened. This makes it impossible for personnel to be near the betatron when the equipment is working.

In addition to the betatron, the foundry also uses a 220,000-v X-ray machine and a Cobalt-60 radiation source unit for making radiographs.

UHF Resistance Welds Join Steel Tubing

Ultra high frequency resistance welding of high quality steel tubing is now being used by a major producer.

Climaxing two years of research, Republic Steel Corp.'s Steel & Tubes Div., Cleveland, has adapted the Thermatool process of the New Rochelle Tool Corp. The tube division is now turning out limited sizes and gages of tube joined by the new method. These run from 1 to 3 in. OD, wall thicknesses from 0.050 to 0.100 in.

Supplements Older Method—Until now, the bulk of the work was joined via the Johnston process pioneered by Republic.

The ultra high frequency method is basically the same as the Johnston process; it produces an edge surface weld and employs the electric resistance principle. However, the new method operates at higher frequencies (450,000 cps as compared to 60, 180, 240, or 440 cps). It also uses a set of stationary welding shoes in place of the copper rolling electrodes presently used in the Johnston technique.

Tests Encouraging—Testing and development thus far has been made on only a portion of the full size and gage range normally produced by the division. But what has been is encouraging, says the company. The new method seems to be capable of producing tube at very high speeds with an excellent quality weld providing proper



MEEHANITE CASTINGS ARE MADE ONLY BY MEEHANITE FOUNDRIES

The American Laundry Machinery Co., Rochester, N. Y.
Atlas Foundry Co., Detroit, Mich.
Banner Iron Works, St. Louis, Mo.
Barnett Foundry & Machine Co., Irvington, N. J.
Blackmer Pump Co., Grand Rapids, Mich.
Centrifugally Cast Products Div., The Shenango Furnace Co., Dover, Ohio
Compton Foundry, Compton, Calif.
Continental Gin Co., Birmingham, Ala.
The Cooper-Bessemer Corp., Mt. Vernon, Ohio and Grove City, Pa.
Crawford & Doherty Foundry Co., Portland, Ore.
Empire Pattern & Foundry Co., Tulsa, Okla.
Florence Pipe Foundry & Machine Co., Florence, N. J.
Fulton Foundry & Machines Co., Inc., Cleveland, Ohio
General Foundry & Mfg. Co., Flint, Mich.
Georgia Iron Works, Augusta, Ga.
Greenlee Foundry Co., Chicago, Ill.
The Hamilton Foundry & Machine Co., Hamilton, Ohio
Hardinge Company, Inc., New York, N. Y.
Hardinge Manufacturing Co., York, Pa.
Johnstone Foundries, Inc., Grove City, Pa.
Kanawha Manufacturing Co., Charleston, W. Va.
Koehring Co., Milwaukee, Wis.
Lincoln Foundry Corp., Los Angeles, Calif.
Nordberg Manufacturing Co., Milwaukee, Wis. and St. Louis, Mo.
Palmyra Foundry Co., Inc., Palmyra, N. J.
The Henry Perkins Co., Bridgewater, Mass.
Pahlman Foundry Co., Inc., Buffalo, N. Y.
The Prescott Co., Menominee, Michigan
Rosedale Foundry & Machine Co., Pittsburgh, Pa.
Ross-Meehan Foundries, Chattanooga, Tenn.
Sonith Industries, Inc., Indianapolis, Ind.
Standard Foundry Co., Worcester, Mass.
The Stearns-Roger Mfg. Co., Denver, Colo.
Valley Iron Works, Inc., St. Paul, Minn.
Vulcan Foundry Co., Oakland, Calif.
Washington Iron Works, Seattle, Wash.
Dorr-Oliver-Long, Ltd., Orillia, Ontario
Hortley Foundry Div., London Concrete Machinery Co., Ltd., Brantford, Ontario
Otis Elevator Co., Ltd., Hamilton, Ontario



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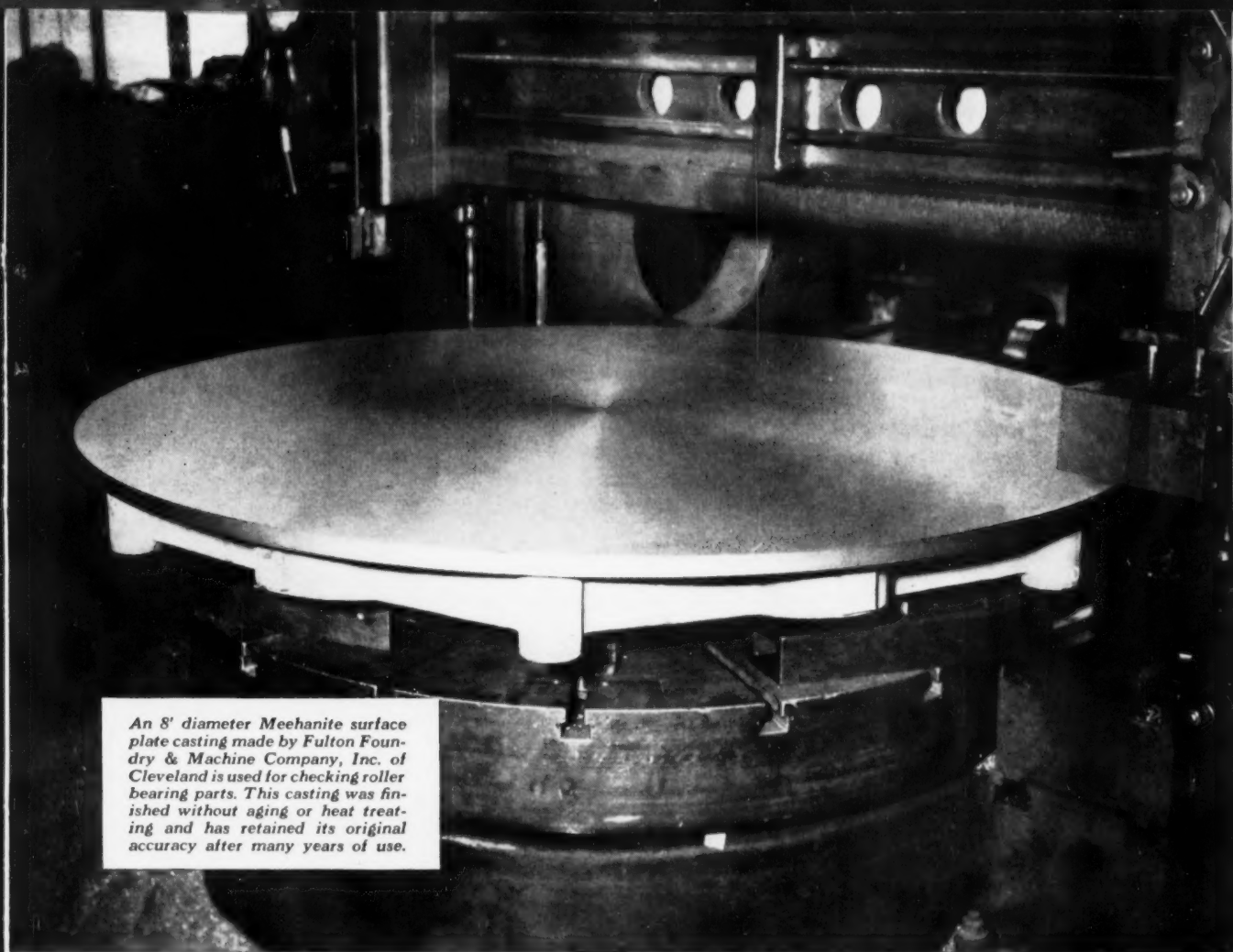
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Bulletin 44—Contains 64 pages of helpful information on how to design sound castings.

Write today to Meehanite Metal Corporation, Dept. I.A., 714 North Avenue, New Rochelle, N. Y.

MEEHANITE®

THE IRON AGE, November 7, 1957



An 8' diameter Meehanite surface plate casting made by Fulton Foundry & Machine Company, Inc. of Cleveland is used for checking roller bearing parts. This casting was finished without aging or heat treating and has retained its original accuracy after many years of use.

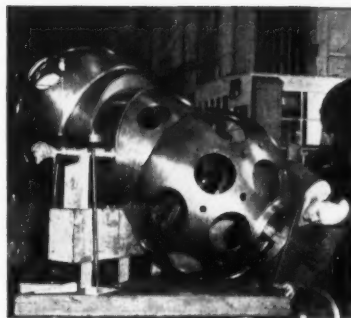
Meehanite castings maintain dimensional stability

Maintenance of accuracy of dimension is of first importance in modern engineering components. Meehanite metal has found wide favor with design engineers because it exhibits an unusually high degree of stability in the "as cast" and also in the hardened condition.

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Although structurally similar to high grade carbon tool steel, Meehanite metal contains graphite particles in controlled quantity and shape. This assures dense and uniformly solid castings regardless of weight or dimension.

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Meehanite® was selected in the construction of the Morrison Planetarium Projector because of its ability to maintain dimensional stability. These castings were made by Vulcan Foundry Company of Oakland, California.

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MEEHANITE METAL

MEEHANITE METAL CORPORATION, NEW ROCHELLE, NEW YORK

TECHNICAL BRIEFS

forming and other adjustments are maintained.

Accurate alignment of the steel edges prior to welding is necessary in order to produce a uniform weld joint, since little or no pressure is exerted on the edges by the welding shoes.

A smaller internal welding bead can also be obtained by this higher frequency process than is normally obtained by resistance welding. This smaller internal bead may, for some applications, save the customer the extra charges necessary for the labor of removing the flash, provided the tubing with lesser flash height as produced by the high frequency method can be used.

Mock-up Aids Builder

A temporary preview of downtown Manhattan's largest office building project is under construc-

tion in a vacant lot 30 miles away.

The 40 x 80 foot structure, two stories high, is a full-scale "mock-up" of a portion of the new head office building of the Chase Manhattan Bank. It's being built for the bank's architects, Skidmore, Owings & Merrill, so that they and bank officials will have an opportunity to compare costs and see the effect of stainless steel versus aluminum as a skin material for the new building. Later the full-size model will be used for trying out lighting units, partitioning and other interior arrangements.

Uses One Lubricant For All Operations

Using a single high-lubricity hot forging compound for all heavy forging work has its advantages. One firm finds that using just one for all hot-die operations pays off in improved die life, reduced scale and a freer flow of metal.

Using the one compound for many varied forging jobs, from ring

gears to axle shafts is Marion Forge Div., Eaton Mfg. Co., Marion, Ohio. The material used is produced by D. A. Stewart Oil Co., Ltd., Chicago. Basically, it serves



Here, a gear blank is placed in a forging hammer.

heavy production forging of axles and pinion gears. However, the company does use it with all its hammers, presses and upsetters.

Makes Removal Easy—The hammer operator swabs dies with the

PAINT FLAKES



AND HEADACHES

Mike's been screaming about the paint flaking off these dashboard panels. Seems the iron phosphate coating isn't holding tight.



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Well, let's see what the humidity and salt-spray tests show.



hot forging compound during and after each blow of the hammer. On top of other advantages, this lets him remove the forging from the die with little difficulty.

Despite the basic differences in the production equipment used, standardization on a single type of high-lubricity compound for hot die use has paid off all around. Being able to standardize on one lubricant eliminates the possibility that the operator will use the wrong compound. Such an error can damage work, dies or both.

Reduces Inventory — Inventory and reordering are also simplified. The fact that the material protects the work even where temperatures range up through 2200°F provides an indication of its suitability for all these operations.

Another key feature of the compound is this: It goes on easily. Special equipment isn't needed. Sometimes, it can be sprayed-on, too. Naturally, how it is applied depends on the nature of the job.

Induction Hardening Boosts Valve Output

The production of hardened valves and valve stems has been substantially increased and in some cases doubled through the use of automatic induction hardening by Aluminum Industries, Inc., Cincinnati.

The induction hardening station consists of a 25-kw induction heater, variable power adjustment, inductor coil, and oil quenching station. Designed and built by the General Electric Co.'s Industrial Heating Dept., Schenectady, N. Y., the station also includes an especially designed variable-speed conveyor. Since both conveyor speed and power adjustment are variable, a single hardening installation can accommodate many types and sizes of valves, including valves of widely differing alloys.

How It Works — In operation, valves are placed in brass V blocks on the conveyor. A guide shoe lo-

cates the valves in the proper position as they approach the inductor coil. After the valves pass through the coil they go into the oil quench station, and are then ejected onto a discharge chute.

Induction hardening has been responsible for an increase of approximately 100 pct in the speed with which both ends and stems of valves can be hardened. Where only the tip is to be hardened the induction process has made possible a 50 pct increase in speed.

Automated Tube Mill Uses Standard Drives

In designing its recently opened 200,000-ton capacity push-button seamless steel mill, a large tubing manufacturer developed its own standard conveyor drive.

Close to 600 standardized individually motorized units are in use at the mill, operated by Mannesmann Tube Co., Ltd., Sault Ste. Marie, Ont. They handle the steel









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Drastically reduced maintenance costs result from the Bailey "stationary wheel" design, which eliminates 80% of the moving parts of ordinary pig casting machines. In this design roller bearing idler wheels are mounted on the frame rather than on the moulds, thus keeping them far as possible away from hot metal.

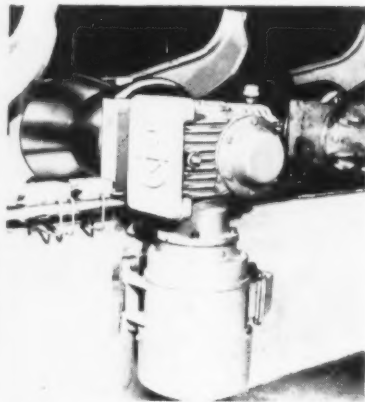
These machines are used in the casting of ferrous and non-ferrous pigs and ingots.



TECHNICAL BRIEFS

between all operations from the loading dock and billet cut-off into and out of the big rotary furnace through the complete tube processing steps in both hot and cold sections of the mill. Another 100 drives will be used in a mill addition now under construction.

Basic Element—Basic element of each conveyor drive is a 1½-hp, 1150-rpm electric motor directly coupled to a standard 3-in.



Some 600 of these conveyor drives keep production moving.

center distance Cone-Drive hollow-shaft speed reducer. It has a double-enveloping worm gearing.

Most conveyor rolls are of the V-groove design to guide the steel. In the section between the furnace and the first piercing mill, however, there are a number of cylindrical rolls for billet transport over a curved conveyor section with side guides.

Knocks Off Scale—The setup is arranged so that it rotates the billets during forward movement. This effectively knocks most of the scale from the billet before it reaches the piercing mill.

Most common reduction ratio in the reducers is 10 to 1, giving a roll speed of 115 rpm. Where different conveyor speeds are required, this is accomplished by changing the ratio of the reducer (ratios used range from 5:1 to 40:1). Motor housing is loosely coupled to the concrete

conveyor stand and acts as a torque arm.

The steel firm gets its speed reducers from Cone-Drive Gears Div., Michigan Tool Co., Detroit.

Radiation Controls Foil Thickness

Strips of film or foil moving at 6000 fpm are measured for millionths of an inch deviation in thinness by a new X-ray gage.

Developed by The Sheffield Corp., Dayton, Ohio, the ultra-fast thinness gage uses low intensity X-ray pulses, emitted 60 to 600 times per second. These permit instantaneous measurement of thinness of foils made of aluminum, steel, copper and brass, plastic film, and sheet or bar stock. Each X-ray pulse provides an individual and independent gage reading of fast-moving strip stock as thin as 0.0002 in.

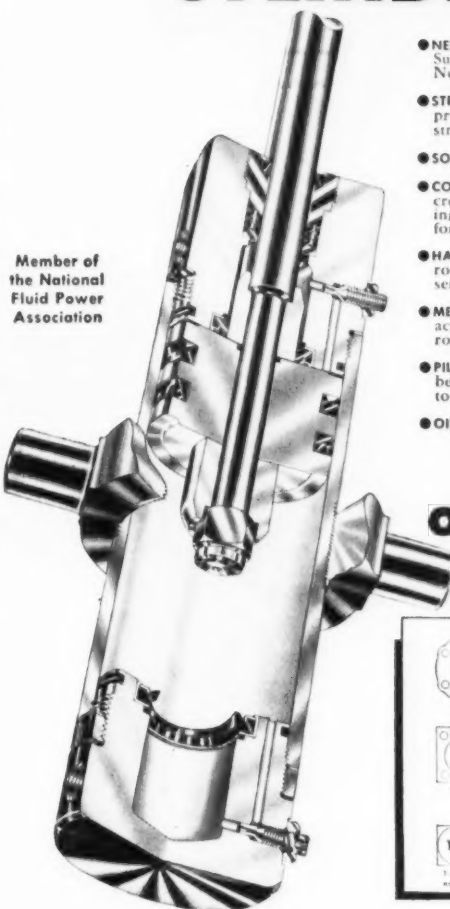
Uses Original Method—Unlike some X-ray gages, it does not average thickness readings over a number of cycles. The new gage assures instantaneous and accurate measurement at the precise point of gaging.

A reading can be taken every $\frac{1}{3}$ in. on a film or foil strip moving at 1000 fpm as the new instrument emits 600 X-ray pulses per second. At this rate the new gage takes 36,000 individual readings each minute.

Works With Controllers—High-speed electronic counting, marking and sorting devices can be hooked up with the new X-ray gage because of its ultra-fast cycle. It will also accommodate automatic strip thickness controllers, recorders, totalizers, production analyzers and other accessory devices.

Thickness is measured by the new instrument without contacting or marring the thin film or foil materials. X-ray pulses are simply flashed at a strip moving between the scanning unit's emitter and receiver. The receiver detects and amplifies the amount of X-ray energy that gets through the mov-

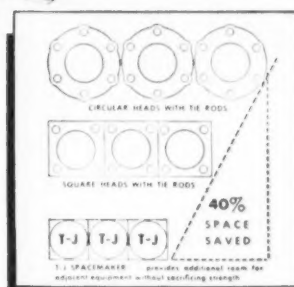
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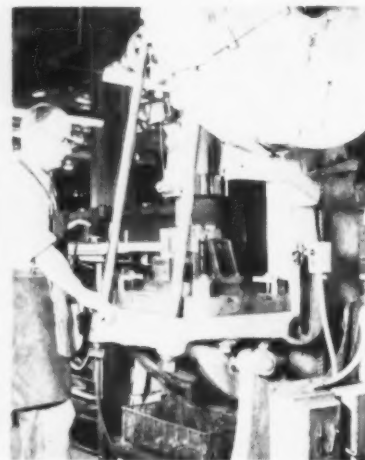
ing strip. Because thicker strips absorb more X-ray energy, the new instrument is able to measure changes in thickness. Deviation from nominal size is given in readings of per cent plus or minus, or in millionths of an inch.

Punch Press Shearing Reduces Scrap

Switching from screw machines to standard-type punch presses with special shear cutters virtually eliminates scrap for a leading nonferrous tube maker. Used in its production of rotating band blanks for artillery shells, the new setup cuts scrap from 50 to 3 pct.

The company, Wolverine Tube Div., Calumet & Hecla, Inc., Detroit, makes the blanks from 90-10 brass tube, 20-ft long.

Old Way Made Waste—Originally the tubing was cut into bands on a standard screw machine, using a 1/16-in. cutter. This resulted in 1/16-in. (0.062) or 50 per cent scrap for each 1/8-in. band pro-



Pressman feeds a tube into the 50-ton press.

duced. By going to power sawing instead of screw machining, the amount of scrap per band is down to 0.025 in. or approximately 20 pct.

Shear cutting of the bands reduces scrap material to the last few inches of the tube—an end piece too short to be held in the press. The shearing operation itself creates no scrap. Equipment used includes three Marshalltown machines, two 14-ton and one 50-ton units, each turning out approximately 40,000 to 50,000 bands per day. When 20 mm shell bands are being produced, a 32-ton No. 3 Press-Rite coining press is used to size the inside diameter and the width.

Simple Work Cycles—Operational sequence is simple. A tube feeds into and through the fixed head. It moves into the movable head of the press; then the clutch is activated to apply constant pressure against the tube. Stepping on the punch press pedal starts the sequence; downstroke of the movable head shears off and automatically ejects a band; and the return to rest position advances the tube for the next cut.

The press stops automatically when the tube has advanced 12 in. short of the end. The pusher mechanism is pulled back by hand, a new tube inserted and the sequence is repeated. One man operates the two shearing presses.

Die, Cutter Design—The 3-piece die, made of D3 type tool steel, consists of a movable head, a fixed head and a back-up stand. The fixed head mounts a cutter for the outside diameter, while the inside diameter is controlled by the cutter mounted on the tube guide rod.

The movable head mounts a cutter for the inside diameter and a cutter for the outside diameter, as well as a flanged bushing. The bushing determines the length of the band being cut by controlling the depth to which the tube penetrates the movable head. By means of a cam slide ejector, the bushing also acts to strip the sheared band from the cutter. The bushing is kept in position by two fingers which are forced against the back-up stand.

Shop Towel Doubles As Apron, Wiper

Towels for shop use should, of course, be chosen on the basis of each type wiper's merits and the particular needs of your individual shop. And don't sell cloth wipers short. They offer many inherent advantages.

Using shop towels as aprons can keep shop uniforms clean longer, cutting costs. With coveralls and other clothing making frequent trips to the laundry because of oil,



Shop man wipes with one cloth, wears another one.

grease and dirt stains received from shop tables and machinery, the use of a protective towel means longer wear.

Safety Factor, Too — What's more, they are a safety factor, too. Towel-aprons often prevent trouser belts or loops from catching on machinery or protruding objects.

"In some plants," says a spokesman for Industrial Wiping Cloth Co., Long Island City, N. Y., "use of a towel apron has been made a shop rule, one willingly adhered to by the men on the production line."

Lightning Is Threat

When constructing an industrial building it's wise to think about potential danger from lightning. This is especially true in the case of smaller structures. These are some-

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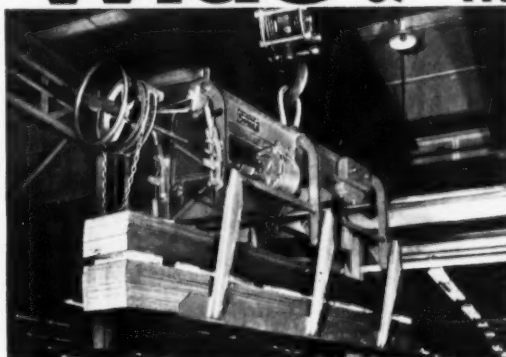
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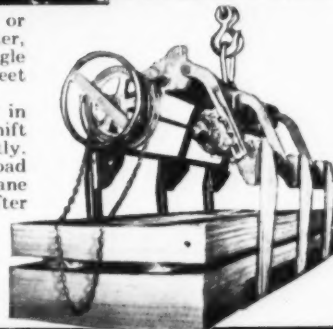
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Bulletin SL-25 gives you the complete story of C-F Lifter advantages to you. Ask for it today. There's no obligation.

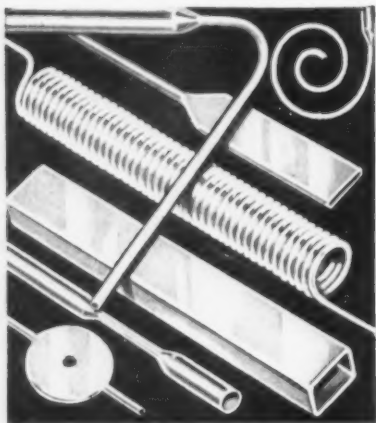


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TECHNICAL BRIEFS

times neglected, which is rarely the case with larger buildings.

And if you subscribe to the "Cone of Protection" theory, forget it. The Lightning Protection Institute, Chicago, finds that the idea that a taller object will shield an area within a radius of two to three times the height of the object doesn't always hold true. In fact, the group cites an example of a 5-story building located between two taller 6-story buildings. It was in the midst of a forest of 20 to 30-story structures. These facts plus inadequate protection plus a lightning storm equalled \$30,000 damage.

Big cities have no monopoly on lightning destruction, though. Among fires in outlying areas, 37 pct are caused by lightning.

Presses Will Expand With Body Designs

Four new production presses have been installed at the Cleveland Frame plant of Midland Steel Products Co. to turn out parts for 1958 cars and to second-guess the automobile of tomorrow.

While car buyers pick and choose and enthuse over present new models, the manufacturers and suppliers to the auto industry face cold facts about parts requirements and tooling for tomorrow's design—the car of 1959 and 1960.

Ready For Widening—Midland, a supplier of finished frames for cars, buses and trucks, has planned for the future by installing presses that will form and blank frame parts even wider and longer and more intricate than those on present cars.

The presses, running five days a week, two shifts a day, are two 250-ton double-crank straight-side types for blanking and two 400-ton two-point eccentrics for forming. They were built by Hamilton Di-

vision, Hamilton, Ohio, of Baldwin-Lima-Hamilton Corp.

Frame front cross plates, requiring intricate forming, are produced on the 400-ton presses. Installed in April and placed in service in June, the presses, in some instances, are capable of producing up to 475 pieces an hour for a total of approximately 15,200 pieces from both presses during a two-shift day.

Racks Boosts Transfer Line's Efficiency

It takes good production engineering to keep a transfer machine with 84 cutting tools operating smoothly and efficiently.

At Ford Motor Co.'s Sterling Chassis Parts Plant, there are five such machines. Used in a group, these complete all milling, drilling and threading operations on ball-joint front wheel spindles.

Two Basic Rules—There are two basic tooling requirements on these production lines. First, shutdowns for tool changes must be kept at a minimum. Second, shutdowns must be made at scheduled intervals that are planned for in advance.

Obviously, shutting down one station on a transfer line affects production of the entire line. It's essential, therefore, to perform as many tool changes as possible whenever a machine is stopped. In addition, individual tools have to be present outside of the machine to produce parts to required tolerances without time-consuming in-the-machine adjustments and trial runs.

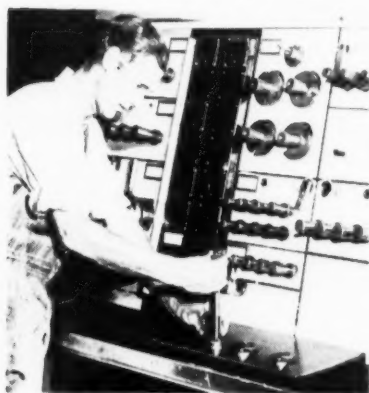
Careful Planning Pays—When the line first went into production, the automaker developed the proper tools and methods for presetting either new or resharpened tools at a "tool control board." This board or rack is the creation of Scully-Jones & Co., Chicago, which worked hand-in-hand with Ford engineers.

Cutting tools and holders, together with necessary presetting tools, are stored in spaces provided in the toolboard. They're identified by work station and/or spindle.

Cutting tools in holders are preset on a tool plate provided with the board.

Changes Tools Fast — Several tool-control boards are located at various points along the transfer line. They let tool changers make switches quickly with less complexity than if all tools were centralized.

Important features of the tool-control panels are electrically actuated impulse counters for each spindle, or group of spindles. To set up the control to monitor the number of parts that can be produced before a tool change is required, the reset button on the counter is depressed and the red reset stop is moved to the required quantity. Then the



Special tool board lets tool changers work more quickly.

black reset knob is turned clockwise until it hits the stop and the counter is ready to go. Because the counter operates from electrical impulses initiated by the machine, it counts actual machine cycles, not just an elapsed time period.

These counters are set to provide long tool life and to notify the operator when the time for change-over approaches. When the time comes to make a tool change, a warning light atop the panel goes on and teams of tool-changers proceed to change all tools which are approaching a change signal. This team action permits putting the machine back on the line more quickly and efficiently than would be possible if each toolsetter tried to operate individually. And, changing tools in groups, rather than individually,

greatly reduces the number of production shutdowns required for changing tools.

Take Care When Using Coated Abrasives

Whether you're involved in sanding, grinding or polishing operations there are precautions to observe in the use of coated abrasives.

Dangers involved in their use, according to the National Safety Council, Chicago, come from dust and fumes, flying particles, breakage of belts and disks, fire and explosion, or personal contact.

Booklet Offers Tips — The safe use of abrasives is discussed in a council publication, "Coated Abrasives." Prepared and reviewed by safety engineers, all experts in the field, it covers everything from the hazards of coated abrasives to how to use belt, disk and drum sanders.

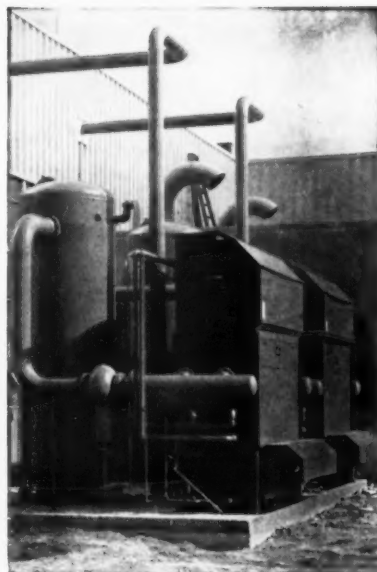
Some important tips it points out include:

Polishing, sanding, grinding, or similar operations creating a spark hazard should not be undertaken near flammable liquids. Nor should they be done in areas where explosive dusts are present — unless special precautionary measures have been established.

Guard The Abrasive—When it is mechanically impossible to guard the abrasive—when it may be in the form of a belt, disk or drum—it may be desirable to provide the operator with a protective apron, gauntlet-type gloves and a face shield.

Coated abrasives stored in hot, dry places may dry out and become brittle. Thus they become far more subject to breakage than if properly cared for. Follow manufacturers' instructions, the council says, on proper storage.

Ground Motor Frames—Protection that would be used on any machinery should be provided. V-belts, chains and gears should be



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TECHNICAL BRIEFS

covered, as well as couplings and projecting shafts. Motor frames should be grounded.

Additional information is contained in a data sheet, No. D-452. This is available from the National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.

Firm Chemical Mills Nine-step Part

Chemical milling needn't be restricted to simple operations. Actually, it can turn out some highly complicated parts—in quantity production.

An example of this is a complex nine-step component being mass formed at United States Chemical Milling Corp., Manhattan Beach, Calif.

Three Taper Angles—Involving three different taper angles, the desired shape requires nine different milling steps. After the plate has passed through staging and been thoroughly cleaned a coating of maskant is applied. This coating restricts the removal of the metal to the exposed areas. After masking, the area in which the first cut is to be made is scribed with a sharp tool and then the maskant is stripped from the area to be milled.

Following this, the first cut, which is a taper, is made by controlling the rate at which the part is immersed into and withdrawn from the chemical solution. Upon completion of the first cut, the exposed section is masked again and two other areas are each scribed, stripped, and tapered.

Five More Cuts—After all three tapers are completed, the part is again remasked so that there are no exposed areas. The area of the deepest cut is then scribed, stripped, and milled. Since each of the remaining five steps represents a shallower cut, no further masking is required. As each succeeding area

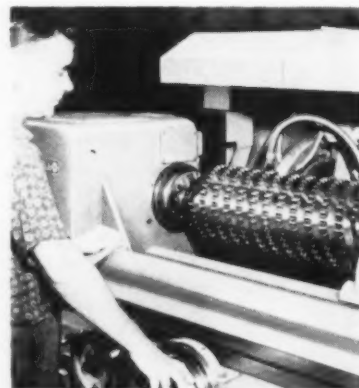
is scribed and milled, additional metal is removed from the exposed sections in order to bring all six cuts to their final, specified depths at the exact same moment.

The finished part, with every section milled to exacting tolerances, is then ready for installation in the vehicle for which it was designed.

Grinder Finishes Big Worm Gear

Thread grinding an exceptionally large worm gear offers some problems, especially when the part is made of hardened steel. But this didn't stop Ex-Cell-O Corp., Detroit, from doing the job.

Using one of its own precision thread grinders, the firm finished the thread form of the big 10-in. OD worm gear. Furnished in rough form by a milling machine



Operator watches as the grinder precision finishes the piece.

manufacturer, the part was finished ground on a machine equipped with a standard three-way cradle type dresser. This unit machined the thread form of the worm to a triple 6-in. lead, 29° included angle. Stock was removed to a depth of 1 3/8 in. and amounted to 0.170 in. Pitch diameter was specified at 8.0763 in.

This operation indicates the flexibility of such thread grinders. In addition to external threads, they can be equipped with an attachment for grinding accurate internal threads.

Shell Molding Ups Quality

Faced with the problem of producing an all brass fireplace andiron of intricate detail, Bennett-Ireland, Inc., Norwich, N. Y., selected shell molding. It was the only method which exactly met all their requirements. Control of wall thickness, reduced finishing operations and the ability to hold small and intricate detail were factors which led to the production of these andirons by shell molding methods.

The company makes the internal shell core for the andirons on a Shalco dump machine to produce inner contours. Four outer interlocking cores which produce tracery design and the outer contour of the part are also produced on a Shalco machine. The shell is molded on a Shalco dump roll-over machine, pattern for which is the core print of interlocking cores and internal contour core.

Uses Yellow Brass—Two of the outer detail cores are assembled in a drag half of the shell mold. The inner body core is then set and the remaining two outer contour cores are locked into the lower two. Cope is placed over the core assemblies and the entire shell is sealed with adhesive phenolic. The casting is then poured from yellow brass.

In addition to a high quality andiron with handsome finish and intricate detail, shell molding provides a number of production advantages. Flash is held down. In fact, in many cases the casting is ready for polishing after sawing the gates. Finishing operations are substantially reduced. In addition, wall thickness is strictly controlled. Finally, shell molding of andirons permits rapid production.

Columbium Metal

Columbium metal melting stock of extremely high purity is produced

in the form of roundels, small cylindrical shapes, that are easy to handle and weigh. A bar-shaped columbium electrode, used for consumable electrode arc melting into ingots, is prepared by cold compacting the readily compressible roundels. The roundels, or shapes pressed from them, melt easily and cleanly. The maker's process results in a columbium melting stock of significantly higher purity than that specified for reactor grade columbium. An extensive future as a base for a new series of high temperature alloys is predicted for columbium metal because of its medium density and high strength at elevated temperatures. The metal is presently used for nuclear applications because its low nuclear cross-section enables it to withstand radiation damage.

The stock is available from Electro Metallurgical Co., Niagara Falls, N. Y.

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Tube Cutting Off
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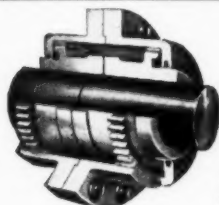
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Table adjustable for straight or taper keyways.
Three sizes. Keyways 1/16" up to 1".

DAVIS KEYSEATER CO.

400 Exchange St., Rochester 8, N. Y.



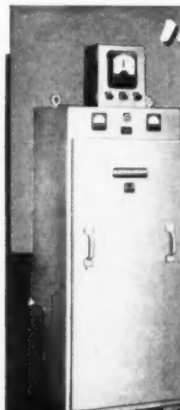
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"MEASURAY" MEASURES THICKNESS ACCURATELY without TOUCHING the MATERIAL



Hot or Cold Strip Steel,
Brass, Copper, Aluminum . . .
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Moving At High Speed.

Simple method—the "Measuray" shoots X-Rays through the material—measures its absorption of the rays. Calibrated meter registers plus or minus per cent of deviation from pre-determined standard. Especially useful on hot mills where material can't be checked by contact gages. Also when material can be deformed by contact such as foil.

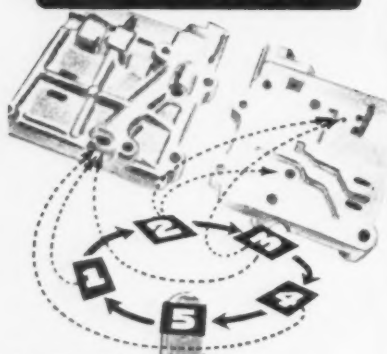
"Measuray" is accurate to 1% of thickness or less. Quickly pays for itself in reduced scrap.

Write Today for Literature to Dept. 8,
The Sheffield Corporation, Dayton 1, Ohio

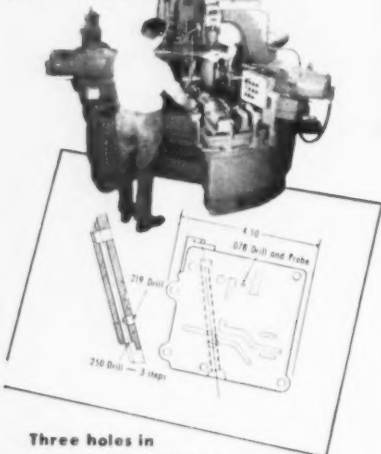
the **SHEFFIELD** Corporation
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drilled and probed
automatically
in one chucking
on a

KINGSBURY



Case Study 3749



Three holes in
this transmission valve cover
... 5 operations
... 350 parts per hour gross

The machine drills three holes in this aluminum die casting. The customer asked us to probe the tiny .078 hole as the best means of inspection. An air-actuated mechanical probe operates at the next station after this drilling. If the hole is not drilled, the probe trips a limit switch which stops the machine.

We pioneered in these indexing automatics and we still think we can build them better than anyone else. They will produce to your specifications. If you have critical high production drilling and tapping jobs, we'd like a chance to show you what we can do. Kingsbury Machine Tool Corporation, Keene, N. H.

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MATERIALS ROUNDUP

Bonds Plastisols To Nylon Base

A major problem facing coat-ers and laminators has involved the adhesion of vinyl plastisols to nylon base fabric.

A new bonding product solves this though—it successfully joins the two materials.

■ One of the biggest problems facing the coatings and laminating industry in recent years has involved the adhesion of vinyl plastisols and organosols to nylon base fabric. It just couldn't be done successfully.

An answer to the problem has been announced by the Borden Co.'s Chemical Div. Peabody, Mass. Here, technicians have developed three bond coatings. These are specifically designed for obtaining high-strength, flexible bonds of plastisol and organosol film to nylon, and many other synthetic fabrics.

Two Types of Bonds—Both a one-coat and a two-coat system have been devised. Both have been evaluated thoroughly in the company's laboratories and both have proved themselves in limited commercial application.

Company technicians point out that the one-coat system is com-

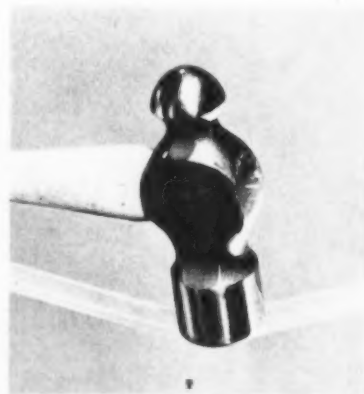
pletely practical. For more critical applications they recommend the two-coat system because it "gives better color," consistently higher bond values over a wider range of weave constructions, and can be fused in less time.

Adhesion values for plastisol films exceed 20 pounds' peel strength per two-inch width.

Adhesive Plastic Tape Has High Strength

New, plastic film, pressure-sensitive tape is similar in appearance and application to cellophane tape but superior in performance, says its developer. It comes in both transparent and opaque finishes.

According to Mystik Adhesive Products, Inc., Chicago, impact resistance of the new tape is nine times higher than that of cellophane



Hammer blow fails to break a sample of the tough tape.

tapes. It adheres to damp surfaces indefinitely and retains the same tensile strength after prolonged soaking as it possesses dry. Tensile strength is registered as 22 lb per

Want More Data?

You may secure additional information on any item briefed in this section by using the reply card on page 143. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

inch of width. Water absorption is reported not to exceed a maximum of 0.05 pct.

Best At 122°F—The material, called Kylon, maintains optimum adhesion at operating temperatures from 122° to 140°F. It resists temperatures up to 180°F for extended periods.

Measuring only 0.0023-in. thick, the plastic tape possesses a high degree of conformance to irregular surfaces. Experimental results indicate Kylon possesses good electrical characteristics, high dielectric strength.

The firm manufactures the tape in 1/4-in. widths and up in 1/8-in. increments on 3-in. cores containing 72 yds. In addition to regular opaque and transparent, Kylon comes in 12 colors.

Hose Resists Chemicals

Highly successful results have been obtained with hoses of Teflon in chemical transfer applications, according to Aeroquip Corp., Jackson, Mich. The chemical inertness of the new material and its flexibility and resistance to extreme temperature ranges have reconciled the conflicting requirements for a good chemical transfer line. Previously, flexible hoses would not stand up under the corrosive action of certain industrial chemicals, and some hose materials absorbed odors and solutions.

Shell Mold Compound

For shell molding work, a new emulsion gives excellent release of patterns with an extremely low film build-up. The silicone parting emulsion is a stock product of dimethyl silicone oil, in a concentration of 35 pct by weight.

After several years of development work in various foundries, it is being widely used to make intricate shell molds for exhaust valves, camshafts, crankshafts, and other parts of leading automobiles. It's ready for use by simply diluting it with tap water and stirring.



THE HAMMER AND THE RETORT

As the geologist's hammer signifies the mineral wealth locked in the earth's crust, the chemical retort signifies the power to free that wealth for the benefit of mankind. Together, the hammer and the retort symbolize the marriage of geology and chemistry that is the tradition and the future of the Foote Mineral Company.

Founded eighty years ago as a supplier of mineral products, Foote has expanded constantly, until now its business includes mining, mineral and alloy processing, chemicals, and metals. And the pioneering done by the company in the extraction and application of many lesser known elements has contributed substantially to many important technological advances.

Foote Mineral Co., 433 Eighteen West Cheltenham Building, Philadelphia 44, Pennsylvania.



RESEARCH LABORATORIES: Berwyn, Pennsylvania
PLANTS: Cold River, N.H.; Exton, Pa.;
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AMERICANS
AND
800,000
OTHERS
ARE



CURED
OF
CANCER

Alive today . . . because they went to their doctors *in time!*

Every year more and more Americans are being cured of cancer. But the tragic fact, our doctors tell us, is that every sixth cancer death is a *needless* death. So many people just don't consult their doctors when the disease is in its early . . . and therefore more curable . . . stage.

Let's give our doctors a chance to head off cancer in time! Form the life-saving habit of a head-to-toe health checkup once a year. For men, this should include a chest x-ray; for women, a pelvic examination.

Make it a habit . . . for life.

AMERICAN CANCER SOCIETY



MATERIALS ROUNDUP

Freight costs for large quantities of water are avoided by shipping it in concentrated form. It is available in one gallon (8-lb) bottles, five gallon (40-lb) drums, and 55 gallon (440-lb) drums.

The material is available from Silicones Div., Union Carbide Corp., New York.

Embossed Steel Strip

Embossed steel strip in fancy patterns is being rolled at U. S. Steel Corp.'s American Steel & Wire Div., Cleveland, Ohio. The pattern is pressed right into the metal. Patterns, limited only to designers'



Worker checks embossed strip's thickness with a micrometer.

imaginings, may vary from frilly flowers to heavier geometric symbols.

Primarily intended for consumer and decorative products, the embossed strip helps fabricators cut down operations and costs.

Molded Carbon

Molded shapes of activated carbon are now commercially available. According to National Carbon Co. Div., Union Carbide Corp., its maker, it has a high adsorption capacity, and is much easier to handle than activated carbon granules of equal volume. The new line of cube and wafer shapes is expected to find wide usage in the adsorption of unwanted odors and vapors.

weldless or welded

Edgewater rings

for bearing races	→	save critical materials
gears	→	
jet engine parts	→	
rotary kiln thro	→	reduce costs
missile and rocket parts	→	
and many other applications requiring highest quality	→	



Send for booklets describing shapes, sizes, materials and other data.

Simple or complex cross-section shapes formed by the Edgewater process are so accurate that a minimum of finishing is required. This saves machining time and material, and keeps costs to a minimum.

Edgewater weldless rings are made in diameters from 5 to 145 inches; welded rings in diameters up to 48 inches. Highest quality workmanship produces rings meeting the most exacting specifications.

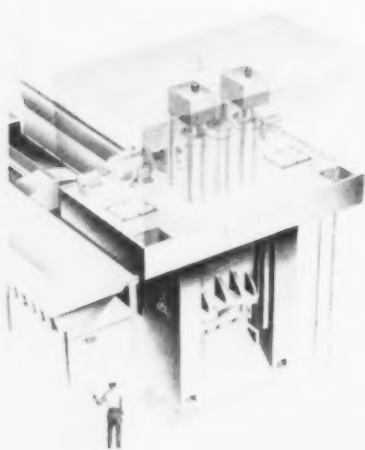


Edgewater Steel Company

P. O. Box 478 • Pittsburgh 30, Penna.

New Production Ideas

Equipment, Methods and Services

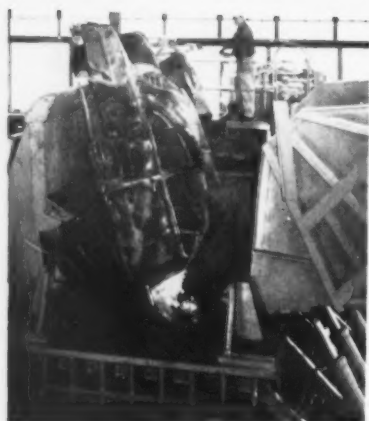


Hydraulic Shear Cuts Scrap in Heavy Volume

Weighing about 300,000 lb, this hydraulic shear cuts large volumes of scrap for consuming mills and foundries. Rugged enough for full-time outdoor operation, the big shear features the precision of its maker's metalworking presses. Its heavy-duty alloy shear blades adjust easily to compensate for wear. As outlined by its producer, the unit: (1) cuts all types of heterogeneous scrap steel; (2) with one operator, does work of five or six other machines requiring 15 to 18 men; (3)

virtually eliminates yard torch-men; (4) develops 600 tons pressure; (5) cuts up to 30 tons of scrap per hour. The feed hopper is 22 ft x 6 ft x 1 ft 10 in. deep. It's loaded with scrap and tilted by hydraulic cylinders dumping the scrap into a charging box. A hydraulic ram operates through the charging box, pushing the scrap into shear position. Ram stroke adjusts in 6-in. increments from 6 to 48 in. (Clearing Machine Corp.)

For more data circle No. 41 on postcard, p. 143



Baling Press Handles Bulky Scrap Items

Entire car bodies and other bulky scrap are handled by this medium-priced baling press. Rather than using a charging box large enough to accommodate an entire auto body, the press performs a pre-baling operation between a powerful auxiliary compression door and its "skip pan loader." This reduces the dimensions of the body to a point where it easily fits into the medium-sized charging box in preparation for baling. Pre-baling usu-

ally takes less than a minute, considerably less time than it takes for cutting-up or shearing of bodies. The loader receives another car body while the 90 second automatic baling cycle is being completed. Under proper conditions, the equipment can bale an entire car body every 2½ minutes on a sustained basis. Approximate bale size: 24 x 24 x 48 in. Charging box: 48 x 72 x 144 in. (Dempster Bros.)

For more data circle No. 42 on postcard, p. 143

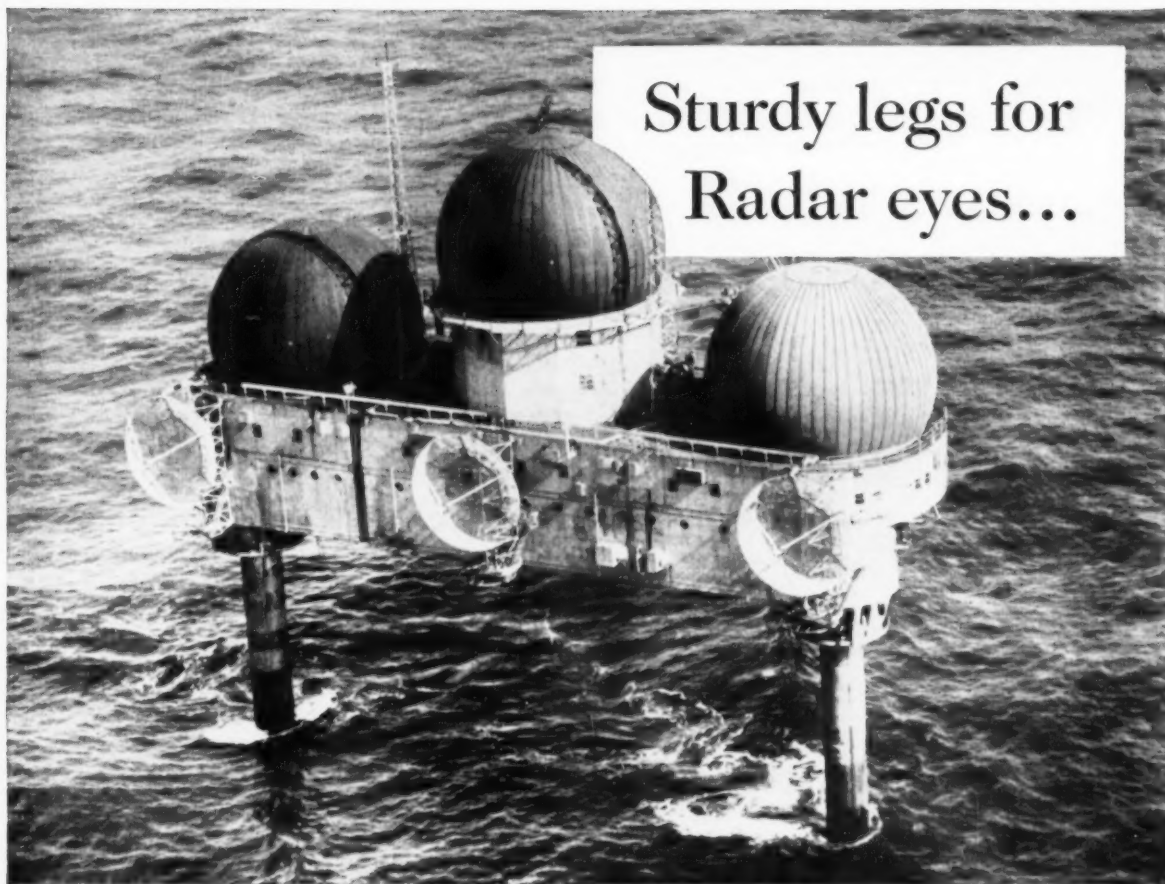


Roll-forming Equipment Corrugates Sheets

Corrugating metal sheets is this machine's job. It works with galvanized steel, aluminized steel, plain or embossed aluminum. Unlike earlier roller die designs, it handles gages 20 through 28. Of all welded construction, its roll shafts are mounted on anti-friction bearings. Operating speed is 150 fpm. Roller die tooling is available for ½ or 7/8-in. depth with control

of coverage and depth. This setup comes as an individual unit for feeding sheets. However, it is also available with a complete decoiling and shearing line for conveying cut lengths into a forming machine. Or the unit can integrate with a complete roll-forming line, using coil stock and cutting it to length. (Dahlstrom Machine Works, Inc.)

For more data circle No. 43 on postcard, p. 143



Sturdy legs for Radar eyes...

One of America's offshore radar warning towers—Texas Tower III—built by Walsh Holyoke Division, Continental Copper and Steel Industries, Inc.

...with each seam checked on Kodak Industrial X-ray Film, Type AA

2700 tons of island rest on these 272-foot welded caissons. With giant seas and howling gales to stand against, every seam must be sound. Radiography provided the evidence of each weld's quality.

Each weld was radiographed using a 10 curie pill of cobalt 60. And because Kodak Industrial X-ray Film, Type AA, provides greatly increased film speed, exposure times could be moderate.

While giving speeds up to twice

that of the former Kodak Type A Film, this new film retains the fine sensitivity characteristics which made Type A the most widely used x-ray film in industry.

Your x-ray dealer and the Kodak Technical Representative will gladly tell you how this new film can improve your radiographic operation and help you get more out of your present x-ray or gamma-ray equipment. It can pay you to get in touch with them.

Read what the new Kodak Industrial X-ray Film, Type AA, does for you:

- Reduces exposure time—speeds up routine examinations.
- Provides increased radiographic sensitivity through higher densities with established exposure and processing techniques.
- Gives greater subject contrast, more detail and easier readability when established exposure times are used with reduced kilovoltage.
- Shortens processing cycle with existing exposure techniques.
- Reduces the possibility of pressure desensitization under the usual shop conditions of use.

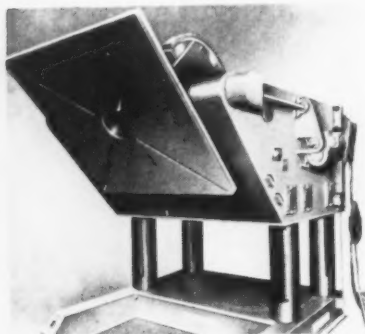
EASTMAN KODAK COMPANY
X-ray Division, Rochester 4, N. Y.



For welding, Kodak Industrial X-ray Film, Types AA, M, and K, are available in the new 70mm by 550 ft. package.

Kodak
TRADE MARK

NEW EQUIPMENT



Heavy-duty Positioner Has Geared Elevation

Featuring a new geared elevation principle, this welding positioner has a weight capacity of 25,000 lb with the center of gravity location of the work 12 in. above the table and 12 in. off-center. Some 33 in. of geared elevation at 20 ipm lifts a full load at 90° tilt of the table. The geared elevation principle consists of a four-post elevator base

having 10-in. OD x 1-in. wall seamless tubes with spur rack teeth for lift pinions. Each post has four concave rollers to maintain rigidity and steadiness of the chassis while elevating. The cross-sectional column of the base measures 47 x 78 in. (Aronson Machine Co.)

For more data circle No. 44 on postcard, p. 143



Fork Truck Cab Switches from Truck to Truck

Interchangeable among four models of the maker's line of fork trucks, this cab reduces the number of cabs required by fork truck fleets where different model vehicles operate outdoors on an irregular schedule. Rigid construction and an integral overhead guard are design features. Excellent visibility is provided by large fore and aft windshields. Slid-

ing side-window vents give variable control of ventilation. Doors and windows are easily removed with only a screwdriver. Rear support of the cab swings free of the truck to facilitate access to the engine. It is spring loaded to remain out of the way during maintenance operations. (Clark Equipment Co.)

For more data circle No. 45 on postcard, p. 143

What Fastening Problem *CAN'T* You Solve

1, 2, 3, 4, 5 **THREADED STUDS**, in a number of styles, serve as ideal replacements for bolts on a wide variety of applications.

6 **TAPPED STUDS**, with internal threads, are used for hanging materials such as electrical equipment, sprinklers and piping.

7 **SHOULDER STUDS**, with threaded extensions, are designed for applications on which spacing of components is required.

8, 9 **SETLOK® STUDS** reduce the cost of securing metal roofing and siding—single skin or insulated sandwich walls.

10 **KNOCK-OFF STUDS** make it possible to have threaded or unthreaded projections as short as 1/4 inch. Section above groove is broken off after welding.

11, 17 **COLLAR STUDS** are used to secure wireways on ships and support refractory materials in steel mills. Also used as spacers.

12 **"J" BOLT STUDS** are used as hooks for materials handling, as rope hooks, etc.

13 **LAGGING STUDS** are used with wire to secure block type insulation materials; also with

clips to secure rain curtains in R.R. passenger car construction.

14, 15 **RECTANGULAR STUDS** with holes offer endless possibilities in construction, shipbuilding and manufacturing.

16 **SLOTTED RECTANGULAR STUDS** are designed to secure reinforcing wire or expanded metal lath.

18, 24 **BENT STUDS** are used mostly as concrete anchors in construction.

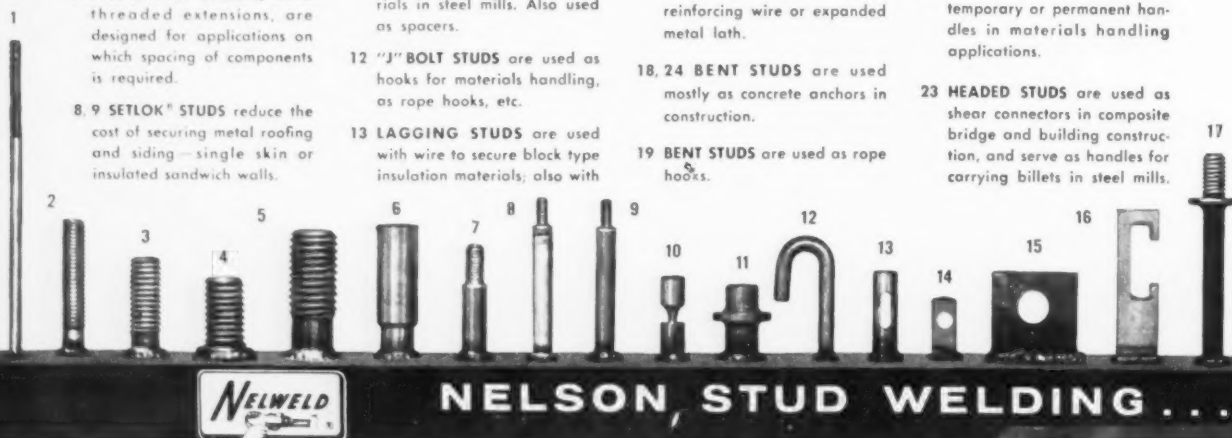
19 **BENT STUDS** are used as rope hooks.

20 **POINTED HOOK STUDS** are ideal for meat hangers.

21 **STUD WELDED TO PLATE**—used principally by refineries to secure insulation in refractory materials in catalytic and hydroformer units.

22 **EYE-BOLT STUDS** are used as temporary or permanent handles in materials handling applications.

23 **HEADED STUDS** are used as shear connectors in composite bridge and building construction, and serve as handles for carrying billets in steel mills.

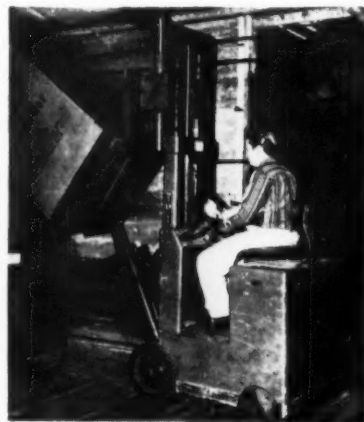


Unique Fork Lift Truck Tilts Loads Over

Equipped with four-wheel drive, this fork truck employs unique tilting forks to handle special items. Using the tilting mechanism, the truck places loads, two at a time, into railroad freight cars with little effort. This, plus other features, saves more than 30 pct on labor alone, some users report. The unit operates in an 8-ft aisle due to its short coupled design which allows a short turning radius. Its stabilizing clamp controls loads with a pressure

limited to 37 lb; this precludes carton damage. The mechanical car-loader's tilting mechanism lets the operator tip over and lay flat the top row of loads in each car. Another key feature of the truck is its ability to load mixed cars. It is designed to pick up, alternately, different sized items. In a typical application, one unit loads four freight cars per 8-hour day. (Morrell Mfg. Co.)

For more data circle No. 46 on postcard, p. 143



Cuts Nonferrous Tube Burr-free, Accurately

For cutting-off nonferrous tubing, this automatic machine produces accurate, burr-free lengths of such materials at high production rates. With a few additional attachments, it automatically cuts - off, straightens, tempers and round - forms tubing from coiled stock. A hopper feed for long tubes up to 20-ft long is available. In a typical application, the unit cuts-off 2-in. diam, 7-in. lengths

of copper tubing at a 2000 per hour rate. Length dimension is consistently held within ± 0.010 in. Clamping the tubing rigidly on each side of the cut during the saw cut-off operation gives burr-free work. A hydraulic cylinder feeds the saw in a straight line, thus avoiding gyroscopic forces which might act on the saw blade. (Walter P. Hill, Inc.)

For more data circle No. 47 on postcard, p. 143



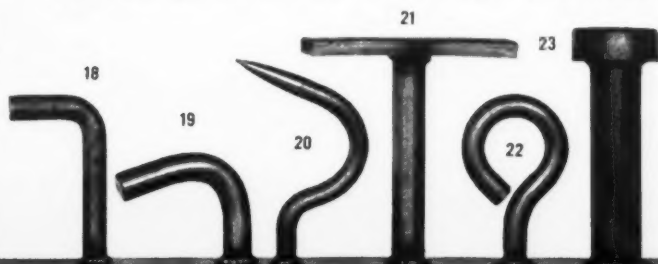
with NELWELD?

These typical Nelson Standard Studs have solved hundreds of knotty problems involving hanging, holding or handling. NELWELD® does the job faster, better and usually at far less cost.

With the NELWELD gun a stud is end welded to steel in a split-second—and it's there to stay. *No holes to drill or tap. No leaks to worry about. No through-bolting. Little or no warpage. No time-consuming manual arc welding.*

Find out how NELWELD could solve your problem . . . increase your production . . . cut your fastening costs . . . improve quality.

In the coupon, check the stud shapes that interest you. We'll send you specifications and the facts about NELWELD.



Send information about the NELWELD method, as well as specifications on the stud types checked at left.

Title

Name

Company

Address

City

State

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
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Division of Gregory Industries, Inc., Lorain, Ohio

Coupon



ALL-HYDRAULIC!

SILENT HOIST KRANE KAR

HYDRAULIC
Boom Swinging
Boom Topping
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Originator and leader in its class for 30 years, KRANE KAR goes ALL-HYDRAULIC. Affords amazing ease of handling... touch control of all crane operations... with other engineering advances that simplify operator's work... eliminating gear shifting and clutch replacements... cutting maintenance to the bone and setting new standards of efficiency and productivity. Get the details. Sold and Serviced by Responsible, Well-Equipped Distributors

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POWER STEERING**

MODELS 1000 TO 25,000 LBS. CAP.

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Pioneer Mfrs. of Heavy Duty Materials-Handling Equipment
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THE IMPROVED PENNSYLVANIA "TAX CLIMATE"

An Important Message for

MANUFACTURERS • DISTRIBUTORS • INDUSTRIAL REALTORS
MANAGEMENT AND ENGINEERING CONSULTANTS

Pennsylvania, this year, has taken major steps to create a "tax climate" favorable to new industry and expansion of established industries.

The 1957 Session of the General Assembly (the Commonwealth's legislature) which adjourned in June made the following basic tax changes:

1. Exempted manufacturers from the capital stock and franchise taxes;
2. Completed, state-wide, the elimination of machinery and equipment from local, ad valorem property taxation (there is no state-level general property tax in Pennsylvania);
3. Repealed the tax on stock transfers;
4. Made the temporary 3 per cent rate of the Pennsylvania Sales Tax permanent — now the principal source of Commonwealth revenues;
5. Reduced the sales tax on purchases made by manufacturing firms.

These changes, plus the absence of a state personal income tax, and the growing dependence of localities on non-property taxes, mean major "advantages", taxwise, to companies locating or expanding in Pennsylvania.



Get the whole story of Pennsylvania's new tax advantages. Send for booklet entitled "The Improved Pennsylvania Tax Climate"

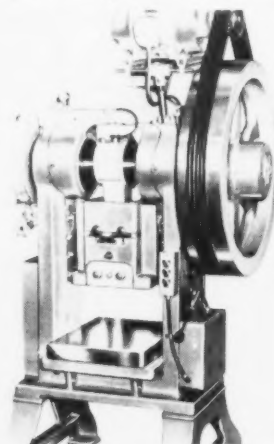
Write to:

Pennsylvania Dept. of Commerce
Main Capitol Building
983 State Street,
Harrisburg, Pennsylvania
Telephone CEdar 4-2912.

NEW EQUIPMENT

Flywheel Press

This straight side flywheel press has a solid frame and capacity of 80 tons. Made to customer's specifications, the press comes in both plain and geared models, available with air clutches if desired. Various models of the press can be used for



a wide variety of work, such as blanking, forming, embossing, etc. Equipped with a bronze bushed main and a Pitman bearing and Timken roller bearings flywheel, presses are available in sizes ranging from 20 to 200 tons capacity. (Perkins Machine Co.)

For more data circle No. 48 on postcard, p. 143

Polishing Belt

Featuring a ribbed construction, a new belt polishing belt is cool running. While its rib surfaces do become heated, areas between the ribs remain substantially cooler. The diagonal ribbed surfaces help the belt to follow difficult contours, especially on half-round shapes. Suitable for many polishing and grinding setups, the belt comes in all sizes. (The Shaw Belting Co.)

For more data circle No. 49 on postcard, p. 143

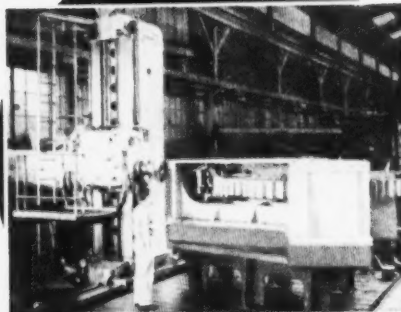
Below-ground Handler

For special handling jobs, a new industrial lift truck has channels that lower below ground level. This truck can be used for such assignments as handling in pits, lowering

Our Production Tools are the finest . . .

SERVICE FOUNDRY

A full complement of modern production tools in various types and sizes makes Avondale's foundry your ideal source for a well rounded casting and machining headquarters. One of our recent additions is an all-new electric furnace, further enlarging our foundry capacities. We are geared to cope with the needs of your industry. Our facilities are extremely versatile. The next time you need service, why not call "SERVICE" . . . Service Foundry, a division of Avondale.



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The photograph illustrates a WILLIAMS-WHITE Hydraulic Bulldozer bending angle sections into complete circles as an initial step in the production of blade circle assemblies for use on road scrapers. The completed ring with gear inserted is shown at right in photo.

This is another example of the versatility of WILLIAMS-WHITE Hydraulic Bulldozers, available in capacities from 50 through 500 tons. For full information regarding these or other machines built to your specifications, write us or one of our representatives.



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OREGON, Portland: Allied Northwest Mach. Tool Corp.
PENNSYLVANIA, Pittsburgh: Frank Ryman's Sons
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NEW EQUIPMENT

palletized materials into dipping or cleaning tanks, or transferring material in a varied floor-level plant. In 6000-lb capacity models, the truck handles loads off a level 72 in. below the floor and raises them to a height of 41 in. above ground level. Primary lifting channels support secondary lift channels which are attached to a fork carriage at the top of the primary channels. Each channel assembly has its own lifting cylinder and set of controls. For operations below ground level, the secondary channels with a fork carriage mounted at the bottom of the mast are lowered hydraulically. Overall height is only 83 in. (Yale & Towne Mfg. Co.)

For more data circle No. 50 on postcard, p. 143

Alignment Bolt

Extremely light-weight, this alignment bolt is designed to re-align, through normal installation, any misalignment existing between aircraft wing panel skins, access doors and structure, and heavy stainless steel honeycomb panels and primary structure. The bolt effects high



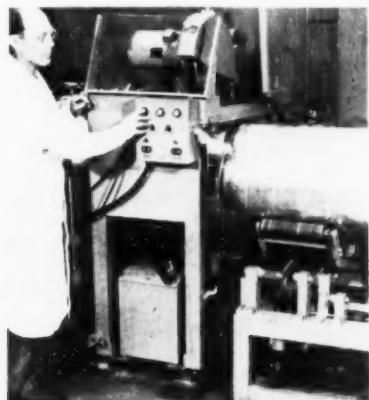
torque values, reduces weight and provides a rapid method of installation and removal. It comes in titanium, type 431 stainless steel and other materials. (Hi-Shear Rivet Tool Co.)

For more data circle No. 51 on postcard, p. 143

Fabrication Unit

This machine reduces the cost of fabricating air conditioning ducts by as much as 20 pct. Built and in use by an air conditioning system maker, the new device manufactures conduit ducts for carrying high pressure air at high velocity. One man can operate the machine from a small control panel. By manipulation of a

few switches and pushbuttons, any number of sizes of "pipe" from three to 24 in. in diameter can be made automatically. The apparatus makes cylindrical duct from a continuous strip of thin gauge metal. Joining

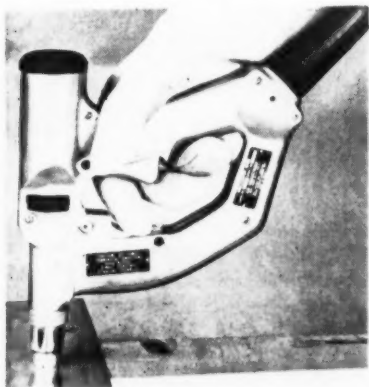


the spirally-wound stock by a series of interlocking seams increases the strength of the tubing as much as five times over conventional round ductwork, its maker states. (Carrier Corp.)

For more data circle No. 52 on postcard, p. 143

Spot Welder

An accessory unit has been designed for service with a spot welding gun in the arc-spot welding of light-gauge metals. It functions to regulate automatically the cooling rate of such spot welds. With this unit, the arc does not end abruptly when the trigger is released and welding action stops. Instead, its in-



tensity drops to a lower level before it extinguishes. Consequently, the weld cools more slowly, which minimizes or eliminates the tendency toward weld cracking in certain

**WHAT'S
THE FASTEST
WAY TO
CLEAN METAL?**

See page 11

**WHAT'S
THE MOST
ECONOMICAL
WAY?**

See page 9

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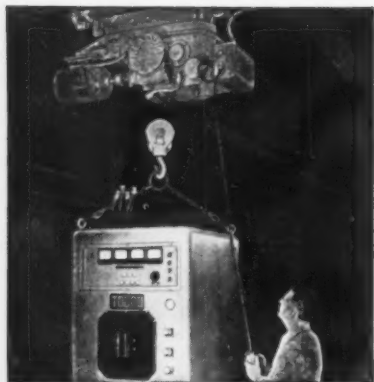
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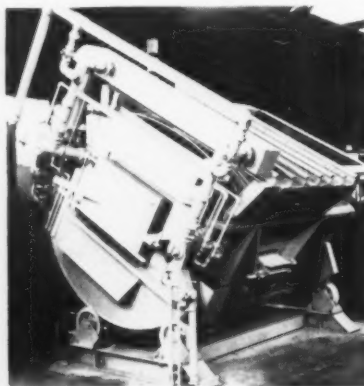
NEW EQUIPMENT

metals when they cool rapidly. This post heating of the weld produces a smooth, craterless spot of very good appearance. Post-weld current intensity and post-weld heat time are adjustable as required by material thickness and other variables. (Air Reduction Sales Co.)

For more data circle No. 53 on postcard, p. 143

Melting Furnace

For providing aluminum continuously from a centralized source, to holding furnaces used in conjunction with die casting, permanent molding, sand casting and other similar applications, new furnaces are of a tilting reverberatory type. They are gas or oil fired, easily charged,



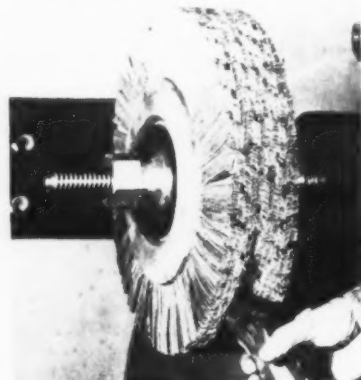
fluxed, alloyed, and cleaned. Maintenance and relining are made simple by the removable spring loaded bung-arches which form the entire roof. The furnaces are presently made in 1000, 1700, 2500, and 3000-lb holding capacities with hourly melt rates closely paralleling the rated capacities. (Stroman Furnace & Engineering Co.)

For more data circle No. 54 on postcard, p. 143

Abrasive Wheel

This abrasive wheel is composed of thousands of narrow finger-like abrasive strips. Such a makeup results in a highly resilient brushing action. It exerts exact control in working complex contours and curvatures without flattening or digging. The strips of abrasive flex over and

around changing contours. The wheel is primarily useful in polishing, deburring and removal of surface flaws on all metals. Sizes now



offered include diameters of 14 and 16 in. with widths from 3 to 60 in. Selection of grits range from fine to coarse. (Merit Products Inc.)

For more data circle No. 55 on postcard, p. 143

Hardening Machines

Two machines harden two types of automotive parts. One machine is a new induction heating machine, 15 kw, water cooled. It's equipped to automatically harden both ends of push rods. The second is a new flame hardening machine. This machine incorporates many new approaches to the problem of low-cost production hardening, including "building block" construction. It's set up to harden cup and pad sections of rocker arms, using natural gas for fuel. (Process Machinery Div., The Cincinnati Milling Machine Co.)

For more data circle No. 56 on postcard, p. 143

Fork Tramrail

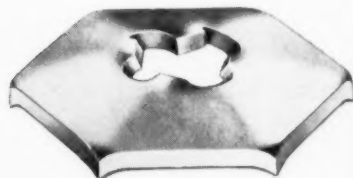
Heavy and versatile, a new overhead fork lift has many new features and refinements made since the first unit was put into operation nearly 30 years ago. Featuring maneuverability, it can be traveled to front, rear or either side of a building, up, down and turned through a full circle clockwise or counterclockwise. The overhead fork lift is particularly advantageous for handling and storing materials in warehouses such as boxes; crates; rolls of carpet-

ing, cloth, paper; pipes; bars; packages of sheets and plates; drums of paints and chemicals; pallets and tote boxes. Overhead fork lifts insure efficient use of warehouse space. Materials can be piled higher and aiseways can be reduced in width. Therefore, more cubic footage can be devoted to storage. In warehouses where only one overhead fork lift is required, the entire handling and storing job can normally be taken care of by one man. His work is safe and easy, consisting of little more than the manipulation of push buttons. (Cleveland Crane & Engineering Co.)

For more data circle No. 57 on postcard, p. 143

Strong Lock Washer

High-strength is a key feature of this lock washer for heavy-duty applications. The washer's design affords bolt locking teeth and rigidity, yet resilience under extreme loads. Originally designed to lock the body bolts of automobiles, this pyramidal



lock washer has found broader application wherever high torques are required. As an example of its strength, the pyramidal washer for a $\frac{3}{8}$ -in. bolt will withstand a torque of 500 in.-lb. (Shakeproof Div., Illinois Tool Works)

For more data circle No. 58 on postcard, p. 143

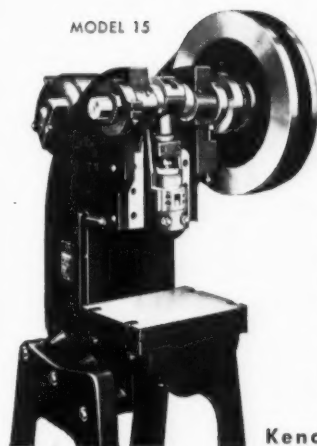
Leakproof Crucible

Crucibles employing "leakproof" pouring lips feature a method of interlocking the lip to the crucible in a tight joint that doesn't leak after cementing. Under the new technique for providing interlocking parts, such as a dovetail connection, the lip is supported on the crucible without external means before the cement hardens. (Electro Refractories & Abrasives Corp.)

For more data circle No. 59 on postcard, p. 143

KENCO 15-TON PUNCH PRESSES

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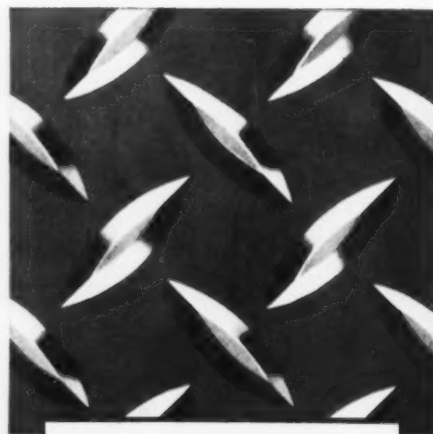


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The Iron Age Summary

Steel Ingot Rate Is Misleading

The ingot rate is no longer a good barometer of steel. Some steel men want it dropped.

Mills are resigned to a strongly competitive fourth quarter. No upturn in sight.

■ The steel ingot rate is no longer an accurate barometer of the steel business. In fact, it's downright misleading.

An operating rate of 80 pct today means steel production equal to a rate of 85 pct just two years ago. This is because the steel industry keeps expanding each year—and the ingot rate is therefore measured against a different base each year.

Proof of Pudding—To prove the point, capacity in 1955 was 125.8 million tons. Rated capacity for 1957 is 133.4 million. And if steel-makers elected to write off some 15 million tons of obsolescent capacity being held as a defense reserve, they could shoot their operating rate into the high nineties.

As an example of what is hap-

pening, steel output this year will be approximately the same as last year—about 115 million tons. Yet the ingot rate this year will be about 86 pct while last year it was about 90 pct.

More Proof—Steel's problem becomes more evident when production of earlier years is related to the 1957 capacity. For instance: In the record year of 1955, some 117 million ingot tons of steel were produced. The ingot rate for that year was 93 pct. If that many tons could be turned out this year, the ingot rate would be less than 88 pct—more than five points lower.

Even more striking is the difference between 1957 and 1951. In 1951 the steel industry turned out 105.2 million tons and operated at an ingot rate of 100.9 pct, the only time in history that the rate exceeded 100 pct. But when you relate that output to present capacity, the operating rate would be only 80 pct.

Index Preferred—Some steel men

would like to see the ingot rate dropped as a measure of output. They would prefer to see the emphasis placed on the American Iron and Steel Institute's Index of Production, which is based on 1947-1949 capacity as 100. This is a stable barometer and does not change from year-to-year. But while this measure of output is available each week, it is largely lost in the shuffle. The reason is that it is comparatively new, while the ingot rate has been used for many years.

Meanwhile, the mills have resigned themselves to a strongly-competitive last quarter. They see nothing over the horizon to alter the picture in the coming months. Customer inventory cutbacks are still a problem. Many buyers are attempting to lower steel inventories for year-end tax purposes.

Delivery Important—Ability to make fast delivery is becoming more and more important in lining up new business. Some mills are boasting that they can deliver tonnages of sheet on 24-hour notice.

Steel Output, Operating Rates

Production	This Week	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	2,023	2,048	2,100	2,474
Ingot Index				
(1947-1949=100)	125.9	127.5	130.7	154.0
Operating Rates				
Chicago	77.0	78.0	82.0	100.0
Pittsburgh	81.5	83.0*	84.0	102.0
Philadelphia	87.0	88.0	81.0	105.0
Valley	65.5	66.5*	67.5	99.0
West	80.0	80.0*	96.0	100.0
Buffalo	99.0	95.0	100.0	105.0
Cleveland	85.0	92.0*	86.5	99.0
Detroit	94.0	95.0*	99.0	104.0
S. Ohio River	84.5	88.5*	77.0	96.0
South	67.0	69.0	70.0	96.0
Upper Ohio R.	72.0	68.0*	80.0	103.0
St. Louis	91.0	92.0	82.0	107.0
Northeast	40.0	41.0	40.0	100.0
Aggregate	79.0	80.0	82.0	100.5

*Revised

Prices At a Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	5.967	5.967	5.967	5.622
Pig Iron (Gross ton)	\$66.42	\$66.42	\$66.42	\$63.04
Scrap, No. 1 hvy (Gross ton)	\$33.33	\$34.00	\$39.33	\$59.83
No. 2 bundles	\$25.00	\$25.67	\$29.17	\$47.33
Nonferrous				
Aluminum ingot	28.10	28.10	28.10	27.10
Copper, electrolytic	27.00	27.00	27.00	40.00
Lead, St. Louis	13.30	13.30	13.80	15.80
Magnesium Ingot	36.00	36.00	36.00	36.00
Nickel, electrolytic	74.00	74.00	74.00	64.50
Tin Straits, N. Y.	89.625	91.25*	92.625	111.25
Zinc, E. St. Louis	10.00	10.00	10.00	13.50

Gear Delivery Promises Stable

Business is improving slightly for the manufacturers of gearing, hydraulic transmissions, and belting.

Users can expect deliveries to stay relatively good with little chance of either price increases or decreases.

■ While there's no universal feeling that business is improving, a few mechanical drive producers are beginning to experience a selling spurt.

The gear industry has been off about 10 pct from last year's excellent dollar volume. But in few instances, companies have even maintained or slightly bettered 1956 dollar levels. This is particularly true of fine-pitch gearing, speed reduction equipment, or aircraft gearing.

Despite the clamor of defense cutbacks from the Pentagon, aircraft

gearing has been a relatively strong market so far this year. Heaviest dropoff in gear business has come from the transport industries and machine tools. Agricultural implements has not been a strong buyer, despite the fact that farm implement sales have held consistently over year-ago levels through all of 1957.

Less Competitive Pricing? — It's very doubtful, on the basis of present sales forecasts, that gearing deliveries will extend later this year. If you are getting a gear on six weeks delivery now, it's the industry's own guess that you'll be getting just as good delivery through January of next year.

On the other hand, some of the extremely competitive pricing of the past 3-4 months may disappear as gearmakers get a little more winter-fat into their backlog.

Transmission Market Slower —

Hydraulic power transmission isn't showing as much increase at the moment, and producers have some idle machine capacity. But even without a strong automotive upsurge, at least a few producers have some new markets booked for January business. Combine this with any jobbed automotive work in December and January, and it appears that hydraulic power transmission equipment suppliers will be moving into a stronger dollar position.

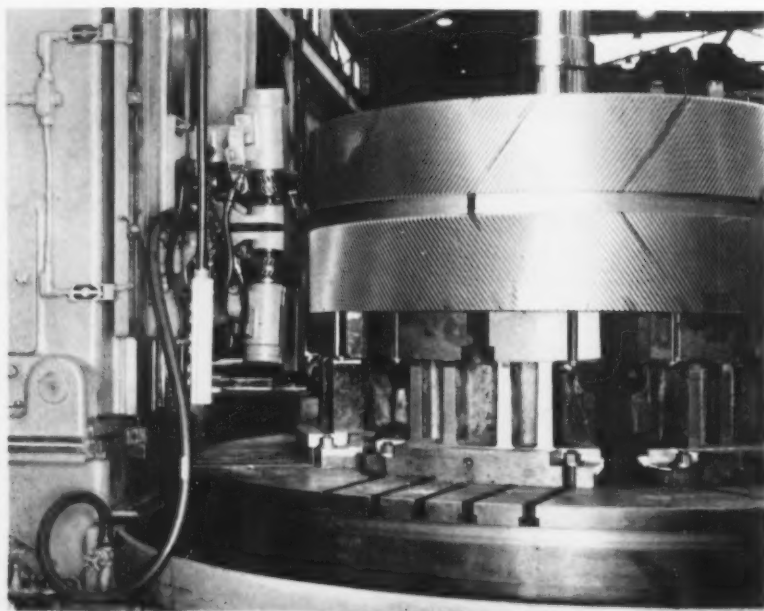
Current estimates place business levels for this industry at about 10-15 pct below a year ago, on a dollar basis. With further losses in the earthmoving equipment market expected it's going to be simple to get virtually off-the-shelf delivery of much equipment through December.

Belting Outlook Good — Belting reports are scattered. Many jobbers have been enjoying a fairly strong year. V-belt reports aren't quite so strong, but this is offset to some extent by recent suggestions of at least a mild upsurge in new business.

There is nothing in the current picture to suggest deliveries of power transmissions equipment will become more difficult. Business levels will hold well for the power transmission industries, and probably improve through the remainder of the year. But even the advent of a strong automotive upsurge will not crowd power transmission industry's capacity to produce.

Prices

A reduction on standard beryllium copper Rollpins has been announced by Elastic Stop Nut Corp. of America. Reductions range from 1 to about 38 pct, depending on the size and diameter of the Rollpin spring pins.



GEARMAKERS HOPEFUL: While gear sales have been running about 10 pct below year ago levels, the manufacturers are encouraged about an improvement during balance of 1957. (Michigan Tool Co. photograph.)

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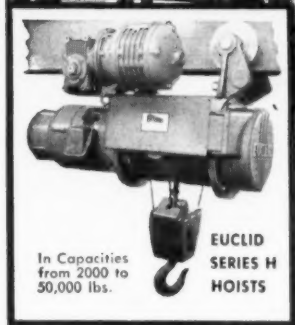
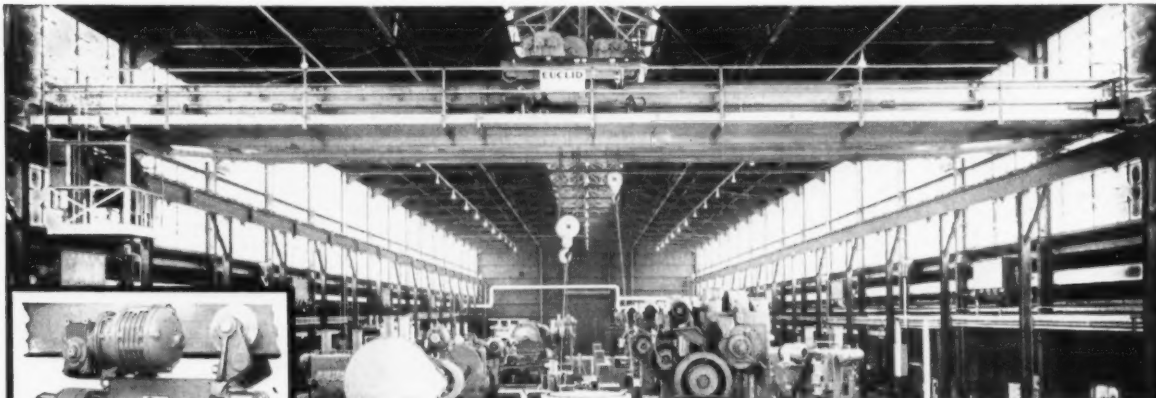


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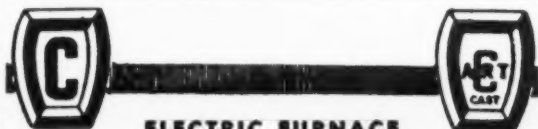
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Structural Market Thawing Out

Warehouses find buyer enthusiasm declining.

Customers don't press them for orders, while mills offer them extra tonnages.

Premium prices on wide flange beams are disappearing.

■ The market for heavy steel—especially structurals—continues to show signs of thawing out.

Most vocal about the changing tone in structural sales are the warehouses. A Midwest supplier who does a big business in structurals and plate draws an ominous comparison between business before and after July. Until that time sales were running 35 pct ahead of last year's levels. Since then they are 45 pct below the same period in '56.

Spring Pickup Expected—Customers are not pressuring the warehouses for structurals these days, but mills are urging the distributors to accept extra structural tonnage. Some outlets report it's easier to move sheet than structurals or plate.

Warehouses on the West Coast are hurting because customers for structurals and reinforcing bars are by-passing them to get mill deliveries. Even a recent price drop of 50 cents a ton on standard structurals hasn't helped bring in orders.

Some brightening of the structural market is expected when the roadbuilding program gets in full swing next spring. Meanwhile even backlogs on wide flange beams are dwindling and premium prices have disappeared.

Wide Flange Price Drop—Inland

Steel Co., effective Nov. 1, reduced its price of wide flange beams \$5 a ton. New base price is 5.275 cents per hundred lb. Inland's previous base—set \$5 above the general price for structural shapes in the Chicago area—was established last Jan. 1. At the time the company explained action was taken "because the established price does not provide an adequate return on (Inland's) investment in new production facilities for wide flange beams."

John F. Smith, Jr., the company's sales vice president now adds, "These basic factors have not been altered. However, with changing market conditions we feel it is necessary to make this reduction so that all our prices will be fully competitive."

Sheet and Strip—Many mills indicate November orders about equal October's. December business, on the basis of bookings so far, will also be at that level. Prospects for an improvement in sales before the end of the year are slim. An **Eastern** mill, reporting that December tonnages look better than November's, also adds they include orders originally placed for November and

PURCHASING AGENT'S CHECKLIST

How a company may improve its existing market and products. **P. 79**

Will high cost and size of man-made industrial diamonds limit their use? **P. 87**

Kaiser Aluminum has new deep draw method for manufacture of aluminum cans. **P. 88**

deferred. **Pittsburgh** mills are experiencing no upsurge in sales and believe October, November and December books will be about equal in tonnage. December orders, say **Cleveland** producers, are not maintaining the November pace. **Chicago** mills report a sales slump in almost all sheet grades.

Bar—In a slack market the emphasis is on fast delivery. Cold fin-
ishers in **Pittsburgh** area are shopping around among mills to get shipments within a week or 10 days. October orders for hot-rolled bar there are about on a par with September's and current month is expected to be at same pace.

Pipe and Tubing—Oil country goods seem headed for a sharp decline in demand. Some reasons: There are 200 less oil rigs operating this year than last, stocks of crude oil are high, and new Canadian and American steel pipe production has been added. Meanwhile, production stays high.

Wire Products—Fourth quarter doesn't look good for the mills as automotive industry orders are not enough to offset decline in merchant products market. Merchant jobbers are cutting inventories earlier than they usually do in preparing for year-end inventory taxes. In addition, auto suppliers have now completed orders to outfit initial model runs and will wait for word from **Detroit** before re-ordering.

Stainless—Sales continue to move sideways with no improvement expected for balance of the year. Delivery competition is very sharp as mills drive to get orders.

Metal Compound Prices—Quantity price reductions on two refractory metal compounds, effective Nov. 1, have been announced by Electro Metallurgical Co., Div. of Union Carbide Corp. Quantity orders for molybdenum disilicide powder are reduced in price 20 pct and silicon nitride powder is dropped from 12½ to 17½ pct.

COMPARISON OF PRICES

(Effective Nov. 5, 1957)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	Nov. 5 1957	Oct. 29 1957	Oct. 8 1957	Nov. 6 1956
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.925¢	4.925¢	4.925¢	4.675¢
Cold-rolled sheets	6.05	6.05	6.05	6.75
Galvanized sheets (10 ga.)	6.60	6.60	6.60	6.30
Hot-rolled strip	4.925	4.925	4.925	4.675
Cold-rolled strip	7.17	7.17	7.17	6.870
Plate	6.12	6.12	6.12	4.87
Plates, wrought iron	18.15	18.15	18.15	10.40
Stain's C-R strip (No. 302)	52.00	52.00	52.00	47.50

Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	\$10.30	\$10.30	\$10.30	\$9.95
Tin plates, electro (0.50 lb.)	9.00	9.00	9.00	8.65
Special coated mfg. ternes	9.55	9.55	9.55	9.20

Bars and Shapes: (per pound)				
Merchant bar	5.425¢	5.425¢	5.425¢	5.075¢
Cold finished bars	7.30	7.30	7.30	6.85
Alloy bars	6.475	6.475	6.475	6.125
Structural shapes	6.275	6.275	6.275	5.90
Stainless bars (No. 302)	45.00	45.00	45.00	40.75
Wrought iron bars	14.45	14.45	14.45	11.50

Wire: (per pound)				
Bright wire	7.65¢	7.65¢	7.65¢	7.20¢

Rails: (per 100 lb.)				
Heavy rails	\$5.525	\$5.525	\$5.525	\$5.075
Light rails	6.50	6.50	6.50	6.00

Semifinished Steel: (per net ton)				
Revolving billets	\$77.50	\$77.50	\$77.50	\$74.00
Slabs, reolling	77.50	77.50	77.50	74.00
Forging, billets	96.00	96.00	96.00	91.50
Alloy blooms, billets, slabs	114.00	114.00	114.00	107.00

Wire Rod and Skelp: (per pound)				
Wire rods	6.15¢	6.15¢	6.15¢	5.80¢
Skelp	4.875	4.875	4.875	4.225

Finished Steel Composite: (per pound)				
Base price	5.967¢	5.967¢	5.967¢	5.622¢

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Averages of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

	Nov. 5 1957	Oct. 29 1957	Oct. 8 1957	Nov. 6 1956
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	\$70.51	\$70.51	\$70.51	\$67.76
Foundry, Valley	66.50	66.50	66.50	63.00
Foundry, Southern Cin'ti	71.65	71.65	71.65	67.17
Foundry, Birmingham	62.50	62.50	62.50	59.00
Foundry, Chicago	66.50	66.50	66.50	63.00
Basic, del'd Philadelphia	70.01	70.01	70.01	66.84
Basic, Valley furnace	66.00	66.00	66.00	62.50
Malleable, Chicago	66.50	66.50	66.50	63.00
Malleable, Valley	66.50	66.50	66.50	63.00
Ferromanganese, 74-76 pct Mn, cents per lb	12.25	12.25	12.25	11.75

Pig Iron Composite: (per gross ton)				
Pig iron	\$66.42	\$66.42	\$66.42	\$63.04

Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	\$33.50	\$33.50	\$40.50	\$61.50
No. 1 steel, Phila. area	35.00	36.00	38.00	57.50
No. 1 steel, Chicago	32.50	32.50*	39.50	60.50
No. 1 bundles, Detroit	22.50	22.50	30.50	60.50
Low plus, Youngstown	33.50	33.50	41.50	68.50
No. 1 mach'y cast, Pittsburgh	50.50	50.50	54.50	61.50
No. 1 mach'y cast, Philadel'a	50.50	50.50	50.50	58.00
No. 1 mach'y cast, Chicago	40.50	41.50	44.50	56.50

Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	\$33.33	\$34.00	\$39.33	\$59.83
No. 2 bundles	25.00	25.67	29.17	47.33

Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	\$15.38	\$15.38	\$15.38	\$14.50
Foundry coke, prompt	\$17.50-\$19	\$17.50-\$19	\$17.50-\$19	\$17-18

Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	27.00	27.00	27.00	40.00
Copper, Lake, Conn.	27.00	27.00	27.00	40.00
Tin, Straits, N. Y.	89.45†	91.25*	92.625	111.25
Zinc, East St. Louis	10.00	10.00	10.00	18.50
Lead, St. Louis	13.30	13.30	13.80	15.80
Aluminum, virgin ingot	28.10	28.10	28.10	27.10
Nickel, electrolytic	74.00	74.00	74.00	64.50
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	33.00	33.00	33.00	33.00

† Tentative. ‡ Average. * Revised.

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	Atlantic & Gulf Coast	West Coast	Vancouver	Montreal
Deformed Bars (¾" Dia. incl. all extras)	\$6.63	\$6.86	\$6.61	\$6.29
Merchant Bars (¾" Round incl. all extras)	7.62	7.85	7.48	7.22
Bars (1½"x½"x20" incl. all extras)	7.76	7.98	7.65	7.38
Angles (2"x2"x½" incl. all extras)	6.57	6.75	6.99	6.69
Beams & Channels (base)	6.82	7.00	7.24	6.94
Furring Channels (C.R. ¾", per 1000')	26.62	27.77
Barbed Wire (per 82 lb. net reel)	6.95	7.40	7.75	7.80
Nails (bright, common, 20d and heavier)	8.38	8.58	9.07	8.99
Larsen Sheet Piling (section II, new, incl. size extra)	7.80	8.10	8.10	7.80
Wire, Manufacturer's bright, low C, (11½ ga.)	7.58	7.52	8.52	8.52
Wire, Galv., Fence Qual., Low C (11½ Gauge)	8.01	8.15	9.42	9.42
Wire, Merchant quality, bl. ann., (10 ga.)	7.60	7.75	8.78	8.78
Rope Wire (.045"), 247,000 PSI, incl. extras	13.60	13.75	13.00	13.00
Wire, fine and weaving, low C, (20 ga.)	10.66	10.80	10.17	12.17
Tie Wire, autom. baler (14½ ASWG, 97 lbs. net)	9.58	9.73	9.64	9.54
Merchant Pipe (½" galv. T & C, per 100')	8.48	8.83
Casing (5½", 15.5 J55, T & C, per 100')	189.00	194.00
Tubing (2½", 6.4 J55, EUE, per 100')	98.00	99.00
Forged R Turn. Bars, C-1035 (from 10" di.)	13.50	13.73	13.50	13.24

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Trade Hopes Bottom May Be Near

Feeling is that prices just can't go down much below today's level.

Industrial scrap is flowing at peak rates, however, preventing dealer resistance from being felt at the mills.

■ It may be wishful thinking, but there is some feeling in the trade that the bottom of the market may be approaching.

Declines are still general, and there is no evidence of significant strength. But some mills are nibbling at the low prices and a few well-financed dealers are laying down some tonnage.

The mill purchases are not particularly large and in many cases they are spread out over a number of yards. Mills are also cautious, and the buys are not serving as yet to establish a floor.

Another factor that prevents dealers from providing any effective resistance is the abundance of industrial scrap. With automotive plants rolling on new 1958 models, automotive tonnage is approaching its peak. The fact that dealer scrap may be drying up at present prices has little effect in the face of high list tonnages.

Another factor is the still high level of mill inventories, in spite of the long absence from the market.

With the decline continuing, The IRON AGE No. 1 heavy melting Composite Price stands at \$33.33, down from \$34 last week. The Composite a year ago stood at \$59.83.

Pittsburgh — Prices of dealer openhearth grades are down another \$1 on the basis of small purchases of No. 2 bundles. The market is still quiet and weak, although prices may have reached the point where good scrap is more attractive. Local industrial bundles went to a broker for around \$35, which was the price paid one week earlier for a spot offering and was higher than expected.

Chicago — Local prices continued to exhibit firmness, with minor slips involving sales of small tonnages. Railroad grades are erratic, with a slightly weaker price level on most grades. Automotive bundles were again purchased at reduced prices.

Philadelphia — Only signs of life in the domestic market were small sales of No. 1 heavy melting, turnings, and cast grades. All reflected continuing market weakness. Prime heavy melting went for \$35.50 at the mill, a drop of \$1.

New York — This market is dead as far as new business is concerned. But leading brokers insist they are still buying enough on old orders to maintain a top of \$31 for No. 1 heavy melting. However, if new business does not develop, this price could drop in a matter of days. It should be pointed out that prices quoted by The IRON AGE in this market are always on cars in dealer yards.

Detroit — A fluid market exists here. Dealers are split on predicting whether the first mill sale will be up, down, or unchanged. Immediate mill action is the key. The

bearish predict a downtrend after any early sales with the market hitting bottom about December.

Cleveland — The market took some hope from two medium-sized Valley purchases of electric furnace grades. Mills paid \$35 for dealer material and \$37 for production lists, but from restricted yards. Dealers in good financial position are starting to lay scrap down. Low prices are drying up dealer sources, but production lists are at their heaviest.

St. Louis — Steel mills are buying on a very limited basis since they have extremely high inventories, the cause of the dull market. Prices are down from \$1 to \$7. Rail grades are weakest items.

Birmingham — The market is characterized by an absence of buyers for most items. Although prices might be considered attractive, most consumers invested so much in high price scrap that they are unwilling to buy more in view of the drop-off in business.

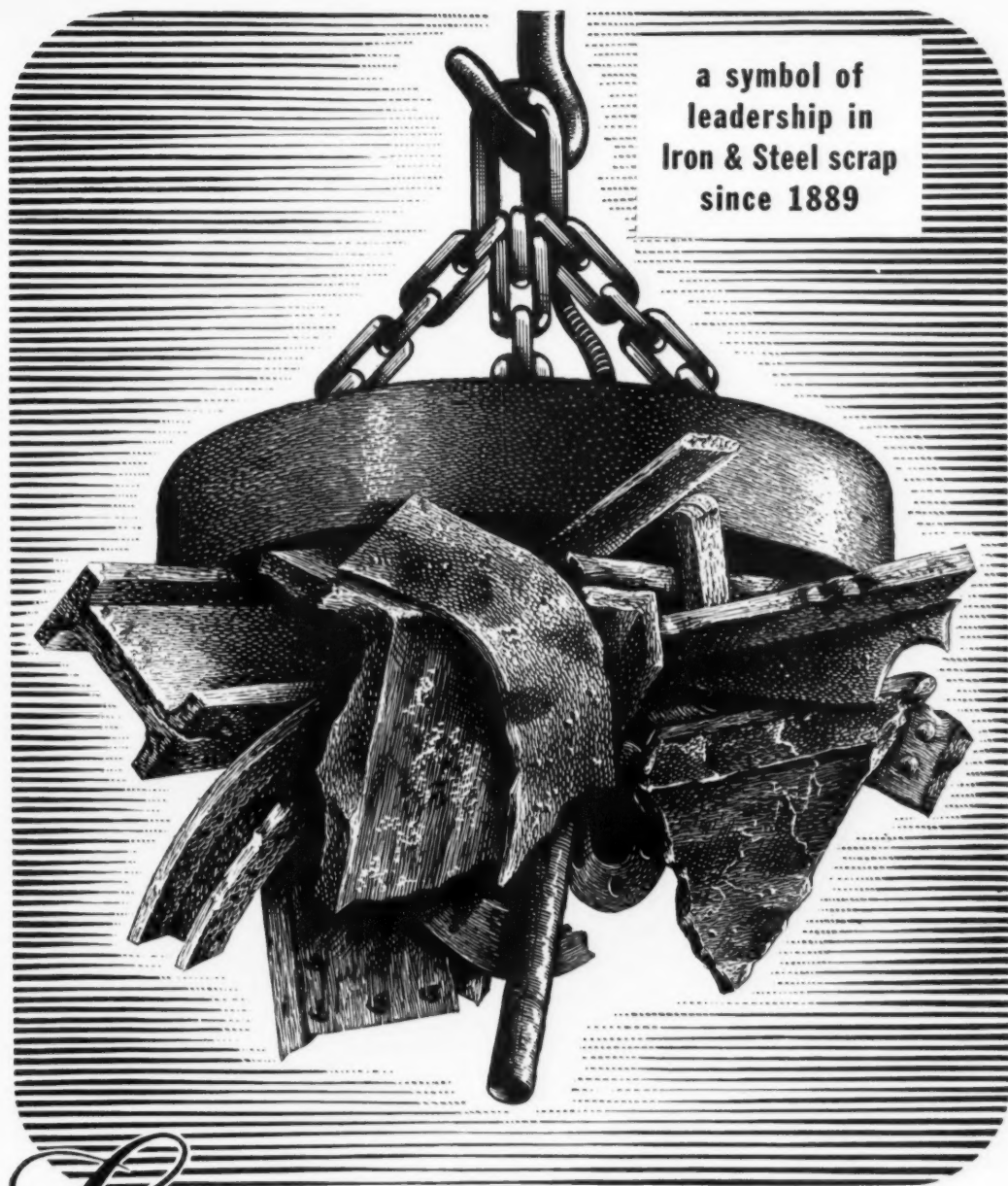
Cincinnati — The market took another sharp drop when an area mill announced token monthly buying with No. 1 dealer heavy melting at \$30 delivered. Shipments are expected to be light and mills have a comfortable inventory. Upriver shipments to Pittsburgh are a possibility if scrap can be sold there.

Buffalo — Small tonnages of No. 1 and No. 2 heavy melting and No. 2 dealer bundles moved at quoted prices late last week. The market continues very weak.

Boston — Prices have dropped again on better grades. The market is still inactive. Brokers say it is practically impossible to sell scrap in this region.

West Coast — Mills are taking only limited tonnages. Prices have settled down at all three ports. Behind this is a spurt in Japanese exporting. There are persistent reports that substantial tonnages will leave West Coast ports by year-end.

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SCRAP PRICES (Effective Nov. 5, 1957)

Pittsburgh

No. 1 hvy. melting	\$32.00 to \$33.00
No. 2 hvy. melting	30.00 to 31.00
No. 1 dealer bundles	32.00 to 33.00
No. 1 factory bundles	30.00 to 31.00
No. 2 bundles	28.00 to 29.00
No. 1 busheling	32.00 to 33.00
Machine shop turn.	17.00 to 18.00
Mixed bor. and ms. turn.	17.00 to 18.00
Shoveling turnings	21.00 to 22.00
Cast iron borings	21.00 to 22.00
Low phos. punch's plate	26.00 to 27.00
Heavy turnings	21.00 to 22.00
No. 1 RR hvy. melting	36.00 to 37.00
Scrap rails, random lgth.	49.00 to 50.00
Rails 2 ft. and under	56.00 to 57.00
RR steel wheels	48.00 to 49.00
RR spring steel	48.00 to 49.00
RR couplers and knuckles	48.00 to 49.00
No. 1 machinery cast.	50.00 to 51.00
Cupola cast.	41.00 to 42.00
Heavy breakable cast.	39.00 to 40.00

Chicago

No. 1 hvy. melting	\$32.00 to \$33.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 dealer bundles	32.00 to 33.00
No. 1 factory bundles	30.00 to 31.00
No. 2 bundles	28.00 to 29.00
No. 1 busheling	32.00 to 33.00
Machine shop turn.	16.00 to 17.00
Mixed bor. and turn.	18.00 to 19.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	18.00 to 19.00
Low phos. forge crops	45.00 to 46.00
Low phos. punch's plate	41.00 to 42.00
Low phos. 3 ft. and under	40.00 to 41.00
No. 1 RR hvy. melting	38.00 to 39.00
Scrap rails, random lgth.	41.00 to 42.00
Rolling rails	46.00 to 47.00
Rails 2 ft. and under	45.00 to 46.00
Automotive tires cut	44.00 to 45.00
Cut bolsters & side frames	44.00 to 45.00
Angles and splice bars	46.00 to 47.00
RR steel car axles	48.00 to 49.00
RR couplers and knuckles	48.00 to 49.00
No. 1 machinery cast.	40.00 to 41.00
Cupola cast.	35.00 to 36.00
Heavy breakable cast.	33.00 to 34.00
Cast iron brake shoes	35.00 to 36.00
Cast iron wheels	41.00 to 42.00
Malleable	48.00 to 49.00
Stove plate	33.00 to 34.00
Steel car wheels	46.00 to 47.00

Philadelphia Area

No. 1 hvy. melting	\$24.50 to \$25.50
No. 2 hvy. melting	21.50 to 22.50
No. 1 dealer bundles	23.50 to 24.50
No. 2 bundles	21.50 to 22.50
No. 1 busheling	25.50 to 26.50
Machine shop turn.	17.00 to 18.00
Mixed bor. and turn.	18.00 to 19.00
Cast iron borings	19.00 to 20.00
Shoveling turnings	20.00 to 21.00
Clean cast. chem. borings	30.00 to 31.00
Low phos. 5 ft. and under	44.00 to 45.00
Low phos. 2 ft. and under	45.00 to 46.00
Low phos. punch's	45.00 to 46.00
Elec. furnace bundles	40.00 to 41.00
Heavy turnings	30.00 to 31.00
RR steel wheels	53.00 to 54.00
RR spring steel	53.00 to 54.00
Rails 18 in. and under	67.00 to 68.00
Cupola cast.	40.00 to 41.00
Heavy breakable cast.	39.00 to 40.00
Cast iron car wheels	47.00 to 48.00
Malleable	58.00 to 59.00
Unstripped motor blocks	32.00 to 33.00
No. 1 machinery cast.	50.00 to 51.00

Cleveland

No. 1 hvy. melting	\$29.00 to \$30.00
No. 2 hvy. melting	22.00 to 23.00
No. 1 dealer bundles	29.00 to 30.00
No. 1 factory bundles	32.50 to 33.50
No. 2 bundles	21.00 to 22.00
No. 1 busheling	29.00 to 30.00
Machine shop turn.	13.00 to 14.00
Mixed bor. and turn.	17.00 to 18.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	17.00 to 18.00
Cut struct'l & plates, 2 ft. & under	34.00 to 35.00
Drop forge flashings	29.00 to 30.00
Low phos. punch's, plate	30.00 to 31.00
Foundry steel, 2 ft. & under	22.00 to 23.00
No. 1 RR heavy melting	34.00 to 35.00
Rails 2 ft. and under	56.00 to 57.00
Rails 18 in. and under	57.00 to 58.00
Railroad grate bars	16.00 to 17.00
Steel axle turnings	17.00 to 18.00
Railroad cast.	43.00 to 44.00
No. 1 machinery cast.	46.00 to 47.00
Stove plate	41.00 to 42.00
Malleable	54.00 to 55.00

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Youngstown

No. 1 hvy. melting	\$32.00 to \$33.00
No. 2 hvy. melting	25.00 to 26.00
No. 1 dealer bundles	32.00 to 33.00
No. 2 bundles	24.00 to 25.00
Machine shop turn.	16.00 to 17.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	20.00 to 21.00
Low phos. plate	33.00 to 34.00

Buffalo

No. 1 hvy. melting	\$32.00 to \$33.00
No. 2 hvy. melting	29.50 to 30.50
No. 1 busheling	32.00 to 33.00
No. 1 dealer bundles	32.00 to 33.00
No. 2 bundles	26.50 to 27.50
Machine shop turn.	16.00 to 17.00
Mixed bor. and turn.	17.00 to 18.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	18.00 to 19.00
Low phos. plate	38.00 to 39.00
Scrap rails, random lgth.	44.00 to 45.00
Rails 2 ft. and under	54.00 to 55.00
RR steel wheels	41.00 to 42.00
RR spring steel	37.00 to 38.00
RR couplers and knuckles	37.00 to 38.00
No. 1 machinery cast.	44.00 to 45.00
No. 1 cupola cast.	39.00 to 40.00

Detroit

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$22.00 to \$23.00
No. 2 hvy. melting	19.00 to 20.00
No. 1 dealer bundles	22.00 to 23.00
No. 2 bundles	17.00 to 18.00
No. 1 busheling	21.00 to 22.00
Drop forge flashings	21.00 to 22.00
Machine shop turn.	8.00 to 9.00
Mixed bor. and turn.	10.00 to 11.00
Shoveling turnings	10.00 to 11.00
Cast iron borings	10.00 to 11.00
Low phos. punch's plate	22.00 to 23.00
No. 1 cupola cast.	31.00 to 32.00
Heavy breakable cast.	27.00 to 28.00
Stove plate	27.00 to 28.00
Automotive cast.	34.00 to 35.00

St. Louis

No. 1 hvy. melting	\$27.00 to \$28.00
No. 2 hvy. melting	21.00 to 22.00
No. 1 dealer bundles	25.00 to 26.00
No. 2 bundles	20.00 to 21.00
Machine shop turn.	14.00 to 15.00
Cast iron borings	15.00 to 16.00
Shoveling turnings	17.00 to 18.00
No. 1 RR hvy. melting	37.00 to 38.00
Rails, random lengths	42.00 to 43.00
Rails, 18 in. and under	48.00 to 49.00
Angles and splice bars	41.00 to 42.00
Std. steel car axles	42.00 to 43.00
RR specialties	43.00 to 44.00
Cupola cast.	42.00 to 43.00
Heavy breakable cast.	35.00 to 36.00
Cast iron brake shoes	33.00 to 34.00
Stove plate	36.00 to 37.00
Cast iron car wheels	35.00 to 36.00
Rolling rails	49.00 to 50.00
Unstripped motor blocks	35.00 to 36.00

Boston

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$24.00 to \$25.00
No. 2 hvy. melting	21.00 to 22.00
No. 1 dealer bundles	24.00 to 25.00
No. 2 bundles	15.00 to 16.00
No. 1 busheling	23.00 to 24.00
Elec. furnace, 3 ft. & under	35.00 to 36.00
Machine shop turn.	10.00 to 11.00
Mixed bor. and short turn.	10.00 to 11.00
Shoveling turnings	11.00 to 12.00
Clean cast. chem. borings	15.00 to 16.00
No. 1 machinery cast.	34.00 to 35.00
Mixed cupola cast.	29.00 to 30.00
Heavy breakable cast.	29.00 to 30.00
Stove plate	26.00 to 27.00
Unstripped motor blocks	29.00 to 30.00

New York

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$30.00 to \$31.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 dealer bundles	19.00 to 20.00
Machine shop turn.	11.00 to 12.00
Mixed bor. and turn.	13.00 to 14.00
Shoveling turnings	15.00 to 16.00
Clean cast. chem. borings	23.00 to 24.00
No. 1 machinery cast.	37.00 to 38.00
Mixed yard cast.	32.00 to 33.00
Charging box cast.	33.00 to 34.00
Heavy breakable cast.	33.00 to 34.00
Unstripped motor blocks	30.00 to 31.00

Birmingham

No. 1 hvy. melting	\$32.00 to \$33.00
No. 2 hvy. melting	28.00 to 29.00
No. 1 dealer bundles	32.00 to 33.00
No. 2 bundles	20.00 to 21.00
No. 1 busheling	32.00 to 33.00
Machine shop turn.	20.00 to 21.00
Shoveling turnings	21.00 to 22.00
Cast iron borings	17.00 to 18.00
Electric furnace bundles	38.00 to 39.00
Elec. furnace, 3 ft. & under	36.00 to 37.00
Bar crops and plate	39.00 to 40.00
Structural and plate, 2 ft.	38.00 to 39.00
No. 1 RR hvy. melting	37.00 to 38.00
Scrap rails, random lgth.	45.00 to 46.00
Rails, 18 in. and under	50.00 to 51.00
Angles & splice bars	43.00 to 44.00
Rolling rails	52.00 to 53.00
No. 1 cupola cast.	47.00 to 48.00
Stove plate	47.00 to 48.00
Charging box cast.	25.00 to 26.00
Cast iron car wheels	37.00 to 38.00
Unstripped motor blocks	36.00 to 37.00

Cincinnati

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$29.50 to \$30.50
No. 2 hvy. melting	21.50 to 22.50
No. 1 dealer bundles	23.50 to 24.50
No. 2 bundles	19.00 to 20.00
Machine shop turn.	15.00 to 16.00
Mixed bor. and turn.	18.00 to 19.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	18.00 to 19.00
Low phos., 18 in. and under	37.00 to 38.00
Rails, random length	16.00 to 17.00
Rails, 18 in. and under	54.00 to 55.00
No. 1 cupola cast.	31.00 to 32.00
Hvy. breakable cast.	32.00 to 33.00
Drop broken cast.	47.00 to 48.00

San Francisco

No. 1 hvy. melting	\$34.00 to \$35.00
No. 2 hvy. melting	31.00 to 32.00
No. 1 dealer bundles	33.00 to 34.00
No. 2 bundles	29.00 to 30.00
Machine shop turn.	20.00 to 21.00
Cast iron borings	20.00 to 21.00
No. 1 RR hvy. melting	36.00 to 37.00
No. 1 cupola cast.	47.00 to 48.00

Los Angeles

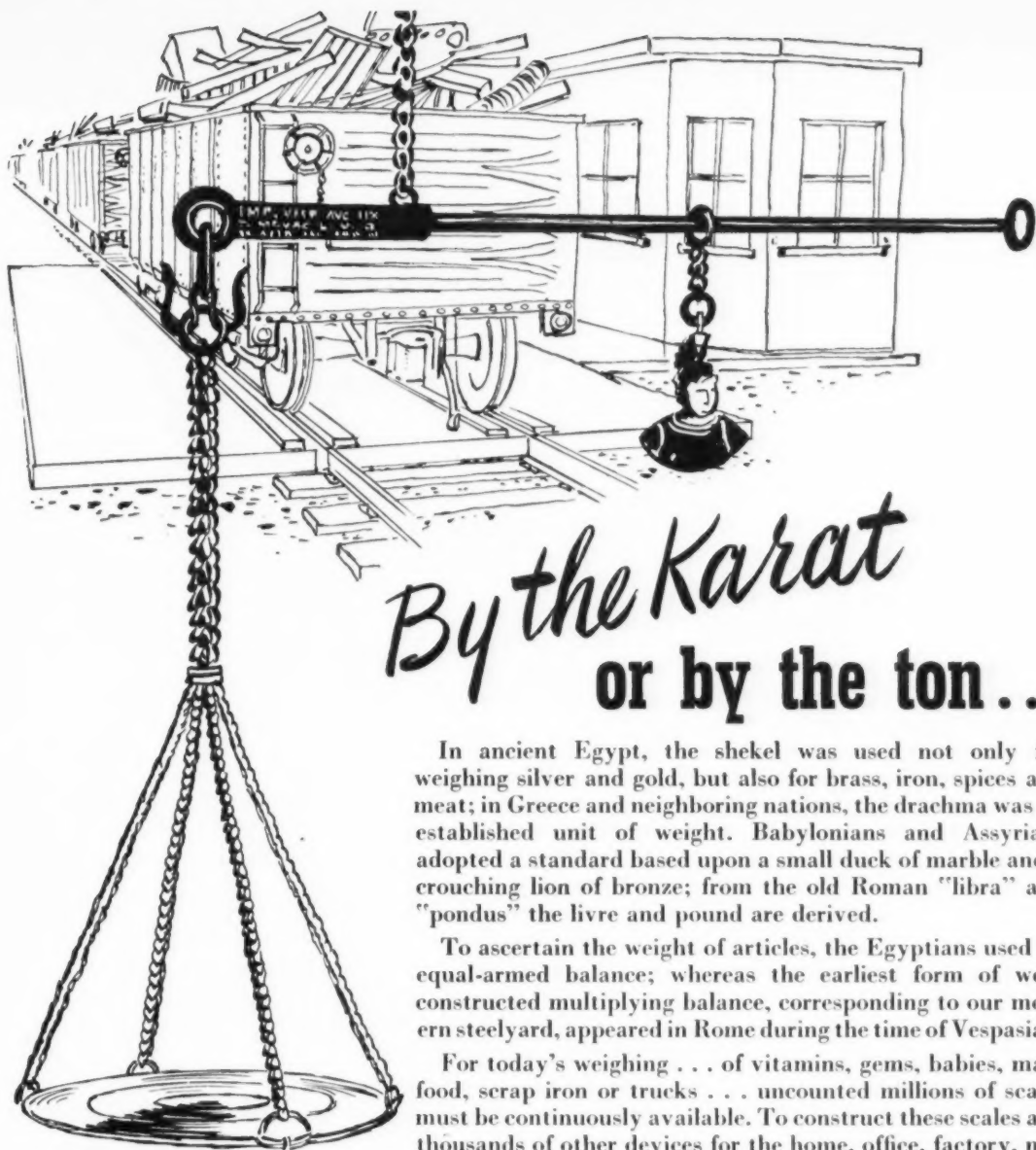
No. 1 hvy. melting	\$36.00 to \$37.00
No. 2 hvy. melting	33.00 to 34.00
No. 1 dealer bundles	33.00 to 34.00
No. 2 bundles	29.00 to 30.00
Machine shop turn.	20.00 to 21.00
Shoveling turnings	15.00 to 16.00
Cast iron borings	15.00 to 16.00
Elec. furn. 1 ft. and under (foundry)	40.00 to 41.00
No. 1 RR hvy. melting	36.00 to 37.00
No. 1 cupola cast.	43.00 to 44.00

Seattle

No. 1 hvy. melting	\$36.00 to \$37.00
No. 2 hvy. melting	33.00 to 34.00
No. 2 bundles	27.00 to 28.00
No. 1 cupola cast.	38.00 to 39.00
Mixed yard cast.	38.00 to 39.00

Hamilton, Ont.

No. 1 hvy. melting	\$35.00 to \$36.00
No. 2 hvy. melting	32.00 to 33.00
No. 1 dealer bundles	35.00 to 36.00
No. 2 bundles	25.00 to 26.00
Mixed steel scrap	20.00 to 21.00
Busheling	20.00 to 21.00
Bush, new fact., prep'd	35.00 to 36.00
Bush, new fact., unprep'd	29.00 to 30.00
Machine shop turn.	20.00 to 21.00
Short steel turn.	20.00 to 21.00
Mixed bor. and turn.	20.00 to 21.00
Rails, rolling	41.00 to 42.00
Cast scrap	47.00 to 48.00



By the Karat or by the ton...

In ancient Egypt, the shekel was used not only for weighing silver and gold, but also for brass, iron, spices and meat; in Greece and neighboring nations, the drachma was an established unit of weight. Babylonians and Assyrians adopted a standard based upon a small duck of marble and a crouching lion of bronze; from the old Roman "libra" and "pondus" the livre and pound are derived.

To ascertain the weight of articles, the Egyptians used an equal-armed balance; whereas the earliest form of well-constructed multiplying balance, corresponding to our modern steelyard, appeared in Rome during the time of Vespasian.

For today's weighing . . . of vitamins, gems, babies, mail, food, scrap iron or trucks . . . uncounted millions of scales must be continuously available. To construct these scales and thousands of other devices for the home, office, factory, mill and mine, an unfailing tonnage of steel must be maintained . . . and scrap is an indispensable ingredient.

For the purchase or sale of iron or steel scrap . . .

phone or write "Your Chicago Broker"



231 S. La Salle St., Chicago

Telephone ANdover 3-3900

Alcoa's Wilmot Hits Discounting

Price slashing is destructive, says Alcoa vice president.

Developing markets and creating new uses are called the best solutions to oversupply.

Shipments in 1957 will be off about 5 pct. But expect 1958 to see loss regained, and then some.

■ "In some (aluminum) products the price situation has reached the point where it might properly be described as demoralized."

This is what Donovan Wilmot, vice president in charge of product sales, Aluminum Co. of America, told the National Assn. of Aluminum Distributors.

Accuses Competition—Mr. Wilmot accuses some segments of the industry of "throwing discretion to the wind in a scramble to get more of the going business."

He decries such tactics because they "do nothing to expand or develop markets." In fact, says Mr. Wilmot, "it is destructive."

"The jungle telegraph works with lightning-like speed and the competitive battle descends to a lower price level."

Answer is New Markets—For his own company, Mr. Wilmot says: "We all are hard at work to create brand new uses for aluminum. We must never let up on this. It is the crux of the whole situation."

The Alcoa vice president's statement comes on the heels of a price slash in wire and cable (The IRON AGE, Oct. 17, p. 156). And the word around the trade is that list prices for soft extrusions are virtu-

ally meaningless since almost everyone is discounting.

Shipments Off—On industrywide outlook, Mr. Wilmot reports total shipments in 1957 will be about 5 pct below last year, but that shipments next year should top 1957 by 5 to 10 pct.

On the long-range outlook, H. T. Wilder, Alcoa's manager of distribution, pegs shipments in 1965 at about 8.5 million lb, double what it was in 1955.

Expansion Cutback—Aluminium Ltd., Canadian aluminum producer, has announced that it is deferring completion of facilities which would have added 80,000 tons to the annual capacity of its Kitimat facilities by the end of 1958.

Alcoa says it is considering another delay in completing its new smelter at Evansville, Ind. Potential output of the new plant is listed as 150,000 tons.

Other producers insist announced expansions will go ahead on schedule. It is unlikely that they will change their minds because (1) many facilities are too far along in construction to quit now, and (2) some involve contracts for outside power which call for stiff penalties if the aluminum company involved does not buy the stipulated power.

Copper

Late last week Revere Copper & Brass, Inc., boosted its base price for copper and copper-base alloy products by 1¢ per lb. By the beginning of this week all major mills had gone along with the hike.

Extras are also up, an average of about 10 pct. Mills say the increase was made necessary by higher cost

of labor, transportation and supplies.

New Tube Mill—Chase Brass & Copper Co. announces it has the country's largest and most highly automated copper tube mill, now operating at its Cleveland plant.

The new mill will turn out copper tube continuously from billet to finished product.

A major ingot maker frankly admits he needs more No. 1 copper, is willing to pay 22½¢ per lb. more than 1¢ in excess of what his competitors and the custom smelters are offering.

He won't explain any further, but barring special situation this could be the start of a firming market.

Tin prices for the week: Oct. 30—91.00; Oct. 31—90.625; Nov. 1—90.00; Nov. 4—89.75; Nov. 5—election day.

Monthly Average Metal Prices

Cents per lb except as noted. Average prices of the major nonferrous metals in October based on quotations appearing in THE IRON AGE, were as follows:

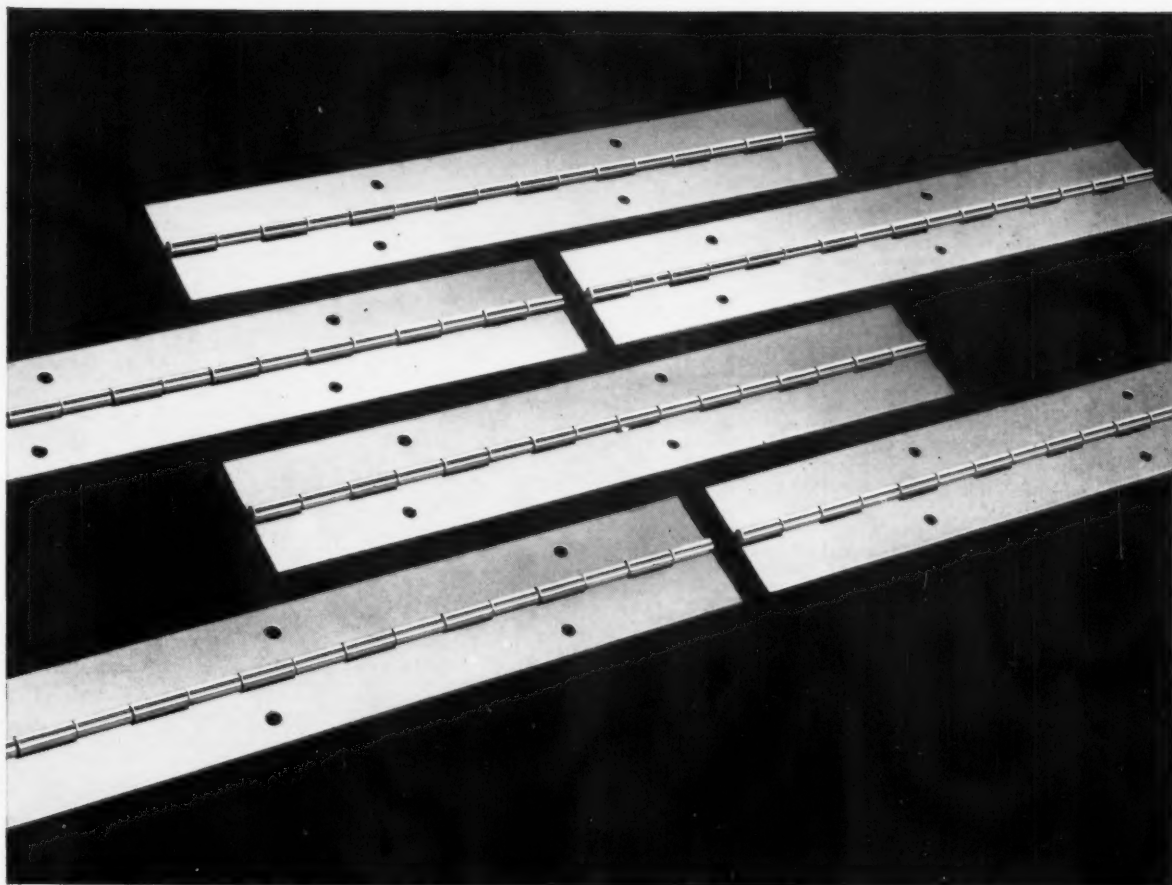
Electrolytic copper, del'd	
Conn. Valley	27.00
Copper, Lake	27.00
Straits Tin, New York	91.891
Zinc, E. St. Louis	10.00
Lead, St. Louis	13.512
Aluminum ingot	28.10

Note: Quotations are going prices.

Primary Prices

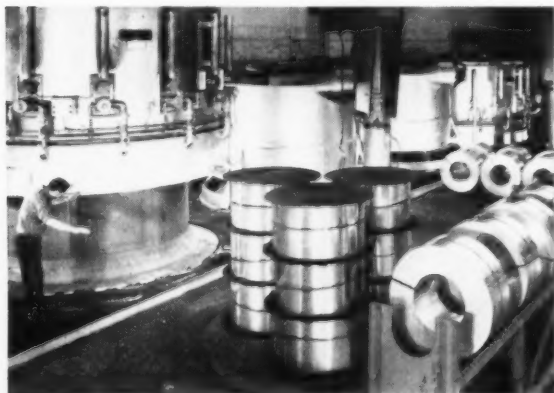
(cents per lb)	Current price	last price	date of change
Aluminum pig	26.00	25.00	8/1/57
Aluminum Ingot	28.10	27.10	8/1/57
Copper (E)	27.00	26.50	9/3/57
Copper (CS)	25.50	26.00	10/15/57
Copper (L)	27.00	26.50	9/3/57
Lead, St. L.	13.30	13.80	10/14/57
Lead, N. Y.	13.50	14.00	10/14/57
Magnesium Ingot	36.00	34.00	8/13/56
Magnesium pig	35.25	32.75	8/13/56
Nickel	74.00	64.50	12/6/56
Titanium sponge	185-250	185-225	8/8/57
Zinc, E. St. L.	10.00	10.50	7/1/57
Zinc, N. Y.	10.50	11.00	7/1/57

ALUMINUM: 99% ingot frt allwd. **COPPER:** (E) = electrolytic, (CS) = custom smelters, electrolytic, (L) = lake. **LEAD:** common grade. **MAGNESIUM:** 99.8% pig. Velasco, Tex. **NICKEL:** Port Colbourne, Canada. **ZINC:** prime western. **TIN:** see above; other primary prices, pg. 188.



**"Anaconda Aluminum is the best metal we've found!"
Lake Park Metal Stamping, Inc., Youngstown, Ohio**

"Anaconda Aluminum gives us the best forming for our piano hinges and is consistent, shipment after shipment," says Mr. James Cain, president of Lake Park Metal Stamping, Inc., hardware manufacturer.



Available for prompt shipment to all points in the U. S.
Anaconda Aluminum Coiled Sheet in gages from 0.006" to 0.064" and in widths up to 28"; coils up to 100 pounds per inch of width, in alloys: 1100, 3003, 3004, 5005, 5050, 5052.

"But even more important is the service," he adds. "We are extremely pleased with the prompt handling and delivery of our orders."

For piano hinges shown above, Lake Park uses Anaconda Aluminum Alloy 5050-H36, 1½" wide by .050" gage, in coils of 16"-18" ID and 36"-46" OD.

HIGH QUALITY AND PROMPT SERVICE

With the most modern equipment for rolling, annealing, and slitting—embodying the latest refinements in control — the Torrington Division of The American Brass Company is in a position to offer extraordinarily good service in high-quality aluminum coiled sheet.

AT YOUR FINGERTIPS

American Brass Company sales offices are located in principal cities from coast to coast. Or contact The American Brass Company, Torrington, Conn. Telephone HUnter 9-3161.

ANACONDA[®]
ALUMINUM COILED SHEET
Made by The American Brass Company

NONFERROUS PRICES

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb., f.o.b. ship. pt., frt. allowed)

Flat Sheet (Mill Finish) and Plate (“F” temper except 6061-0)

Alloy	032	081	136-249	250-3
1100, 3003	46 6	44 3	43 6	42 7
5052	54 0	48 9	47 2	45 4
6061-0	51 4	47 0	45 2	45 1

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
6-8	45 0 46 8	60 4 64 1
12-14	45 7 47 2	61 3 65 8
24-26	49 0 49 5	72 1 76 8
36-38	58 0 58 6	96 2 99 8

Screw Machine Stock—2011-T-3

Size*	3/4	5/8	3/4-1	1 1/4-1 1/2
Price	63 0	62 5	61 0	58 6

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb.)

Length*→	72	96	120	144
019 gage	\$1 420	\$1 893	\$2 367	\$2 839
024 gage	1 774	2 366	2 957	3 549

MAGNESIUM

(F.o.b. shipping Pt., carload frt. allowed)

Sheet and Plate

Type 1	Gage→	250-3 00	250-2 00	188	081	032
AZ31B Stand, Grade				67 9	69 0	77 9
AZ31B Spec.				93 3	95 7	108 7
Tread Plate				70 6	71 7	
Tosling Plate		73 0				

Extruded Shapes

Factor *	6-8	12-14	24-26	36-38
Comm. Grade (AZ31C)	69 6	70 7	75 6	89 2
Spec. Grade (AZ31B)	84 6	85 7	90 6	104 2

Alloy Ingot

AZ91B (Die Casting) 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	126	106	128
Strip, CR	124	108	138
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	120	105	121
Seamless tube	157	129	209
Shot, blocks	87		

COPPER, BRASS, BRONZE

(Freight included on 5000 lbs.)

	Sheet	Wire	Rod	Tube
Copper	50 13		47 36	50 32
Brass, 70-30	41 02	44 56	45 26	46 93
Brass, Low	46 50	47 04	46 44	48 31
Brass, R L	47 37	47 61	47 31	50 18
Brass, Naval	48 27		42 58	51 68
Muntz Metal	46 39		42 20	
Comm. Br.	48 78	49 32	48 72	51 34
Mang. Br.	52 01		46 11	
Phos. Br. 5%	69 07		69 57	

Free Cutting Brass Rod 32.30

TITANIUM

(10,000 lb. base, f.o.b. mill)

Sheet and strip, commercially pure, \$9.50-\$10.60; alloy, \$14.75; Plate, HR, commercially pure, \$8.00-\$8.75; alloy, \$19.75. Wire, rolled and/or drawn, commercially pure, \$7.50-\$8.00; alloy \$10.00; Bar, HR or forged, commercially pure, \$6.15-\$6.40; alloy, \$6.15-\$6.35; billets, HR, commercially pure, \$6.00-\$6.25; alloy, \$6.00-\$6.20.

PRIMARY METAL

(Cents per lb. unless otherwise noted)

Antimony, American, Laredo, Tex... 33.50
Beryllium aluminum 5% Be, Dollar per lb contained Be... \$74.75
Beryllium copper, per lb contain'd Be... \$43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading... \$71.50
Bismuth, ton lots... \$ 2.25
Cadmium, 99.9%, small lots... \$ 1.70
Calcium, 99.9%, small lots... \$ 4.55
Chromium, 99.8% metallic basis... \$ 1.31
Cobalt, 97-99% (per lb)... \$2.00 to \$2.07
Germanium, per gm, f.o.b. Miami, Okla., refined... \$9.50 to \$13.50
Gold, U. S. Treas., per troy oz... \$35.00
Indium, 99.9%, dollars per troy oz... \$ 2.25
Iridium, dollars per troy oz... \$86 to \$89
Lithium, 98%... \$11.00 to \$14.00
Magnesium, sticks, 100 to 500 lb... 59.00
Mercury, dollars per 76-lb flask, f.o.b. New York... \$230 to \$233
Nickel oxide sinter at Copper Cliff, Ont., contained nickel... 71.25
Palladium, dollars per troy oz... \$23 to \$24
Platinum, dollars per troy oz... \$82 to \$87
Rhodium... \$120.00 to \$125.00
Silver ingots (¢ per troy oz.)... 90.625
Thorium, per kg... \$43.00
Uranium, normal per kg... \$49.00
Vanadium... \$ 3.45
Zirconium sponge... \$10.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-6-5 Ingot
No. 115... 26.75
No. 120... 25.75
No. 123... 24.25
80-10-10 Ingot
No. 305... 30.75
No. 315... 28.75
88-10-2 Ingot
No. 210... 38.25
No. 215... 34.00
No. 245... 30.25
Yellow Ingot
No. 405... 22.00
Manganese Bronze
No. 421... 24.50

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
0.30 copper max... 25.25-26.00
0.60 copper max... 25.00-25.75
Piston alloys (No. 122 type)... 24.25-25.00
No. 12 alum (No. 2 grade)... 22.00-23.00
108 alloy... 22.25-23.00
195 alloy... 25.25-26.75
13 alloy (0.60 copper max.)... 25.00-25.75
ANS-679... 22.25-23.00

Steel deoxidizing aluminum, notch bar granulated or shot

Grade 1-95-97%... 23.00-24.00
Grade 2-92-95%... 21.75-22.50
Grade 3-90-92%... 20.50-21.50
Grade 4-85-90%... 18.25-19.25

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	23	22 1/4
Yellow brass	17 1/2	15 1/2
Red brass	20 1/2	19 1/2
Comm. bronze	21	20 1/2
Mang. bronze	16 1/2	15 1/2
Yellow brass rod ends	17 1/2	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire... 21 1/2
No. 2 copper wire... 19 1/2
Light copper... 17 1/2
*Refinery brass... 19 1/2
Copper bearing material... 18 1/2
*Dry copper content

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire... 21 1/2—22 1/4
No. 2 copper wire... 19 1/2—20 1/4
Light copper... 17 1/2
No. 1 composition... 19 1/4
No. 1 comp. turnings... 18 1/4
Hvy. yellow brass solids... 13
Brass pipe... 15 1/4
Radiators... 15

Aluminum

Mixed old cast... 13 1/2—14 1/2
Mixed new clips... 16 —17
Mixed turnings, dry... 11 —15

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire... 18 1/2—19
No. 2 copper wire... 16 1/2—17
Light copper... 15 —15 1/2
Auto radiators (unsweated)... 11 3/4—12
No. 1 composition... 15 1/2—16
No. 1 composition turnings... 15 —15 1/2
Cocks and faucets... 12 —12 1/2
Clean heavy yellow brass... 11 —11 1/2
Brass pipe... 12 1/2—13
New soft brass clippings... 13 —13 1/2
No. 1 brass rod turnings... 11 1/4—11 3/4

Aluminum

Alum. pistons and struts... 5 1/2—6
Aluminum crankcases... 10 1/2—11
1100 (28) aluminum clippings... 14 —14 1/2
Old sheet and utensils... 10 1/2—11
Borings and turnings... 10 1/2—7
Industrial castings... 10 1/2—11
2024 (24S) clippings... 12 —12 1/2

Zinc

New zinc clippings... 4 —4 1/2
Old zinc... 3 —3 1/2
Zinc routings... 1 3/4—2
Old die cast scrap... 1 1/2—1 3/4

Nickel and Monel

Pure nickel clippings... 50-55
Clean nickel turnings... 45-50
Nickel anodes... 50-55
Nickel rod ends... 50-55
New Monel clippings... 33-35
Clean Monel turnings... 22-25
Old sheet Monel... 30-32
Nickel silver clippings, mixed... 20
Nickel silver turnings, mixed... 17

Lead

Soft scrap lead... 8 1/2—9
Battery plates (dry)... 4 —4 1/4
Batteries, acid free... 2 3/4—3

Miscellaneous

Block tin... 75 —76
No. 1 pewter... 40—60
Auto babbitt... 39—40
Mixed common babbitt... 11 —11 1/4
Solder joints... 15 —15 1/2
Siphon tops... 42
Small foundry type... 12 1/2—12 3/4
Monotype... 12 1/2—12 3/4
Lino. and stereotype... 11 1/2—11 3/4
Electrotype... 10 1/2—10 3/4
Hand picked type shells... 7 1/2—8
Lino. and stereo. dross... 3 1/2—3 3/4
Electro dross... 2 1/4—3

IRON AGE		Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.												
STEEL PRICES		BILLETS, BLOOMS, SLABS			PIL-ING	SHAPES STRUCTURALS			STRIP					
		Carbon Re-rolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton		Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled
EAST	Bethlehem, Pa.			\$114.00 B3		5.325 B3	7.80 B3	5.325 B3						
	Buffalo, N. Y.	\$77.50 R3, B3	\$96.00 R3, B3	\$114.00 R3, B3	6.225 B3	5.325 B3	7.80 B3	5.325 B3	4.925 R3, B3	7.15 S10	7.325 B3			
	Phila., Pa.									7.70 P15				
	Harrison, N. J.													15.05 C11
	Conshohocken, Pa.		\$101.00 A2	\$121.00 A2					4.975 A2	7.20 A2	7.325 A2			
	New Bedford, Mass.									7.60 R6				
	Johnstown, Pa.	\$77.50 B3	\$96.00 B3	\$114.00 B3		5.325 B3	7.80 B3							
	Boston, Mass.									7.70 T8				15.40 T8
	New Haven, Conn.									7.60 D1				
	Baltimore, Md.									7.15 T8				
	Phoenixville, Pa.					5.325 P2		5.325 P2						
	Sparrows Pt., Md.								4.925 B3		7.325 B3			
	Bridgeport, Wallingford, Conn.	\$80.50 N8	\$101.00 N8	\$114.00 N8						7.60 W1				
MIDDLE WEST	Pawtucket, R. I. Worcester, Mass.									7.70 N7 7.70 A5				15.40 N7 15.20 T8
	Alton, Ill.								5.125 L1					
	Ashland, Ky.								4.925 A7					
	Canton-Massillon, Dover, Ohio		\$96.00 R3	\$114.00 R3, T3						7.15 G4		10.45 G4		14.85 C11
	Chicago, Ill. Franklin Park, Ill. Evanston, Ill.	\$77.50 U1, R3	\$96.00 U1, R3, W8	\$114.00 U1, R3, W8	6.225 U1	5.275 U1, W8, P13	7.75 U1, Y1 W8	5.275 U1	4.925 W8, N4, A1	7.25 A1, T8 M8			8.10 W8, S9, J3	15.05 A1, S9, G4
	Cleveland, Ohio									7.15 A5, J3		10.45 A5	8.10 J3	
	Detroit, Mich.			\$114.00 R3					5.025 G3, M2	7.25 M2, D1, D2, G3, P11	7.425 G3	10.60 D2 10.55 G3	8.10 G3	
	Anderson, Ind.									7.15 G4				
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana	\$77.50 U1	\$96.00 U1	\$114.00 U1, Y1		5.275 U1, J3	7.75 U1, J3	5.275 J3	4.925 U1, J3, Y1	7.15 Y1	7.325 U1, J3, Y1	10.60 Y1	8.10 U1, Y1	
	Sterling, Ill.	\$77.50 N4				5.275 N4			5.025 N4					
	Indianapolis, Ind.									7.30 J3				15.20 J3
	Newport, Ky.												8.10 A9	
WEST	Middletown, Ohio													
	Niles, Warren, Ohio Sharon, Pa.		\$96.00 S1, C10	\$114.00 C10, S1					4.925 R3, S1	7.15 R3, T4 S1	7.325 R3, S1	10.50 S1 10.45 R3	8.10 S1	15.05 S1
	Pittsburgh, Pa. Midland, Pa. Butler, Pa. Aliquippa, Pa.	\$77.50 U1, P6	\$96.00 U1, C11, P6	\$114.00 U1, C11, B7	6.225 U1	5.275 U1, J3	7.75 U1, J3	5.275 U1	4.925 P6	7.15 J3, B4, S7			8.10 S9	15.05 S9
	Weirton, Wheeling, Follansbee, W. Va.					5.275 W3			4.925 W3	7.15 W3, F3	7.325 W3	10.50 W3		
	Youngstown, Ohio	\$77.50 R3	\$96.00 Y1, C10	\$114.00 Y1			7.75 Y1			7.15 Y1, J3	7.325 U1, Y1	10.65 Y1	8.10 U1, Y1	15.05 J3 10.65 Y1
	Fontana, Cal.	\$88.00 K1	\$105.50 K1	\$135.00 K1		6.075 K1	8.55 K1	6.225 K1	5.825 K1	9.00 K1				
	Geneva, Utah		\$96.00 C7			5.275 C7	7.75 C7							
	Kansas City, Mo.					5.375 S2	7.85 S2						8.35 S2	
	Los Angeles, Torrance, Cal.		\$105.50 B2	\$134.00 B2		5.975 C7, B2	8.45 B2		5.675 C7, B2	9.05 J3			9.30 B2	17.25 J3
	Minnequa, Colo.					5.575 C6			6.025 C6	9.10 K1				
	Portland, Ore.					6.025 O2								
	San Francisco, Niles, Pittsburg, Cal.		\$105.50 B2			5.925 B2	8.40 B2		5.675 C7, B2					
	Seattle, Wash.		\$109.50 B2			6.025 B2	8.50 B2		5.925 B2					
SOUTH	Atlanta, Ga.					5.475 A8			5.125 A8					
	Fairfield, Ala. City, Birmingham, Ala.	\$77.50 T2	\$96.00 T2			5.275 T2, R3, C16	7.75 T2		4.925 T2, R3, C16		7.325 T2			
	Houston, Lone Star, Texas		\$101.00 S2	\$119.00 S2		5.375 S2	7.85 S2						8.35 S2	

(Effective Nov. 4, 1957)

IRON AGE	<i>Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.</i>											

STEEL
PRICES

SHEETS

WIRE
ROD

TINPLATE†

BLACK
PLATEHot rolled
18 ga.
& heavy.Cold
rolled

Galvanized

Enamel-
ingLong
TonneHi Str.
Low Alloy
H.R.Hi Str.
Low Alloy
C.R.Hi Str.
Low Alloy
Galv.Cokes*
1.25 lb.
base boxElectro*
0.25 lb.
base boxHolloware
Enameling
29 ga.

EAST

Bethlehem, Pa.

Buffalo, N. Y.

Claymont, Del.

Coatesville, Pa.

Conshohocken, Pa.

Harrisburg, Pa.

Hartford, Conn.

Johnstown, Pa.

Fairless, Pa.

New Haven, Conn.

Phoenixville, Pa.

Sparrows Pt., Md.

Worcester, Mass.

Trenton, N. J.

MIDDLE WEST

Alton, Ill.

Ashland, Ky.

Canton-Massillon,
Dover, Ohio

Chicago, Joliet, Ill.

Sterling, Ill.

Cleveland, Ohio

Detroit, Mich.

Newport, Ky.

Gary, Ind. Harbor,
Indiana

Granite City, Ill.

Kokomo, Ind.

Mansfield, Ohio

Middletown, Ohio

Niles, Warren, Ohio
Sharon, Pa.Pittsburgh, Pa.
Midland, Pa.Butler, Pa.
Donora, Pa.

Aliquippa, Pa.

Portsmouth, Ohio

Weirton, Wheeling,
Follansbee, W. Va.

Youngstown, Ohio

WEST

Fontana, Cal.

Geneva, Utah

Kansas City, Mo.

Los Angeles,
Torrance, Cal.

Minneapolis, Colo.

San Francisco, Niles,
Pittsburgh, Cal.

Seattle, Wash.

SOUTH

Atlanta, Ga.

Fairfield, Ala.
Alabama City, Ala.

Houston, Tex.

† Special coated mfg.
terne deduct 50¢ from
1.25-lb. coke base box
price. Can-making quality
blackplate 55 to 128 lb.
deduct \$2.20 from 1.25 lb.
coke base box.
* COKES: 1.50-lb.
add 25¢.
ELECTRO: 0.50-lb. add
25¢; 0.75-lb. add 65¢;
1.00-lb. add \$1.00. Differ-
ential 1.00 lb. 0.25 lb.
add 65¢.

(Effective Nov. 4, 1957)

STEEL
PRICES

EAST

MIDDLE WEST

WEST

SOUTH

BARS

PLATES

WIRE

	Carbon ¹ Steel	Reinforc- ing	Cold Finished	Alloy Hot- rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfrs. Bright
Bethlehem, Pa.				6.475 B3	8.775 B3	7.925 B3					
Buffalo, N. Y.	5.425 R3,B3	5.425 R3,B3	7.35 B5	6.475 B3,R3	8.775 B3,B5	7.925 B3	5.10 B3		7.20 B3		7.65 W6
Claymont, Del.							5.10 C4		7.20 C4	7.625 C4	
Coatesville, Pa.							5.10 L4		7.20 L4	7.925 L4	
Conshohocken, Pa.							5.20 A2	6.175 A2	7.20 A2	7.625 A2	
Harrisburg, Pa.							5.80 P2	6.275 P2			
Milton, Pa.	5.575 M7	5.575 M7									
Hartford, Conn.			7.80 R3		9.075 R3	7.925 B3					
Johnstown, Pa.	5.425 B3	5.425 B3		6.475 B3			5.10 B3		7.20 B3	7.625 B3	7.65 B3
Fairless, Pa.	5.575 U1	5.575 U1		6.625 U1							
Newark, N. J.			7.75 W10 7.75 P10		8.95 W10 8.95 P10						
Camden, N. J.											
Bridgeport, Conn.	5.45 N8	5.65 N8	7.65 N8 7.85 W10 7.80 J3	6.55 N8	8.925 N8						
Putnam, Conn.											
Willimantic, Conn.											
Sparrows Pt., Md.		5.425 B3					5.10 B3		7.20 B3	7.625 B3	7.75 B3
Palmer, Worcester, Readville, Mass.			7.85 B5,C14		9.075 A5,B5						7.95 A5, W6
Mansfield, Mass.											
Spring City, Pa.			7.75 K4		8.95 K4						
Alton, Ill.	5.625 L1										7.85 L1
Ashland, Newport, Ky.							5.10 A7,A1		7.20 A1		
Canton, Massillon, Ohio			7.30 R3,R2	6.475 R3,T5	8.775 R3,R2, T5						
Chicago, Joliet, Waukegan, Ill.	5.425 U1,R3, W8,N4,P13	5.425 U1,R3, N4,P13	7.30 A5, W10,W8 B5,L2,N9	6.475 U1,R3, W8	8.775 A5, W10,W8 L2,N8,B5	7.925 U1,W8	5.10 U1,A1, W8,J3	6.175 U1	7.20 U1,W8	7.625 U1,W8	7.65 A5,R3, W8,N4, K2,W7
Harvey, Ill.											
Cleveland, Ohio	5.425 R3	5.425 R3	7.30 A5,C13		8.775 A5, C13	7.925 R3	5.20 R3,J3	6.175 J3		7.625 R3, J3	7.65 A5, C13
Detroit, Mich.	5.525 G3	5.775 G3	7.30 J3 7.50 P8,B5	6.475 J3 6.575 G3	8.775 R3 8.975 B3,P3, P8	8.025 G3	5.20 G3		7.35 G3		
Duluth, Minn.											7.65 A5
Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.425 U1,J3, Y1	5.425 U1,J3, Y1	7.30 R3,J3	6.475 U1,J3, Y1	8.775 R3,M4	7.925 U1, Y1	5.10 U1,J3, Y1	6.175 J3,J3	7.20 U1,Y1	7.625 U1, Y1,J3	7.75 M4
Granite City, Ill.							5.30 G2				
Kokomo, Ind.											7.75 C9
Sterling, Ill.	5.525 N4	5.525 N4					5.10 N4				7.75 K2
Niles, Warren, Ohio Sharon, Pa.			7.30 C10	6.475 C10,S1	8.775 C10	7.925 S1	5.10 R3,S1		7.20 S1	7.625 R3, S1	
Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.425 U1,J3	5.425 U1,J3	7.30 A5,B4, R3,J3,C11, W10,S9,C8	6.475 U1,J3, C11,B7	8.775 A5, W10,R3,S9, C11,C8	7.925 U1,J3	5.10 U1,J3	6.175 U1	7.20 U1,J3, B7	7.625 U1,J3, B7	7.65 A5, J3,P6
Portsmouth, Ohio											7.65 P7
Weirton, Wheeling, Follansbee, W. Va.							5.10 W5				
Youngstown, Ohio	5.425 U1,R3, Y1	5.425 U1,R3, Y1	7.30 A5,Y1, F2	6.475 U1,Y1	8.775 Y1,F2	7.925 U1,Y1	5.10 U1,R3, Y1		7.20 Y1	7.625 U1, R3,Y1	7.65 Y1
Emeryville, Cal. Fontana, Cal.	6.175 J5 6.125 K1	6.175 J5 6.125 K1		7.525 K1		8.625 K1	5.90 K1		8.00 K1	8.425 K1	
Geneva, Utah							5.10 C7			7.625 C7	
Kansas City, Mo.	5.675 S2	5.675 S2		6.725 S2		8.175 S2					7.90 S2
Los Angeles, Torrance, Cal.	6.125 C7,B2	6.125 C7,B2	8.75 R3,P14	7.525 B2	10.65 P14	8.625 B2					8.60 B2
Minnequa, Colo.	5.875 C6	5.875 C6					5.95 C6				7.90 C6
Portland, Ore.	6.175 O2	6.175 O2									
San Francisco, Niles, Pittsburg, Cal.	6.125 C7 6.175 B2	6.125 C7 6.175 B2				8.675 B2					8.60 C7,C6
Seattle, Wash.	6.175 B2,N6	6.175 B2				8.675 B2	6.00 B2		8.10 B2	8.525 B2	
Atlanta, Ga.	5.625 A8	5.625 A8									7.85 A8
Fairfield, Ala. City, Birmingham, Ala.	5.425 T2,R3, C16	5.425 T2,R3, C16,S11	7.90 C16			7.925 T2	5.10 T2,R3			7.625 T2	7.65 T2,R1
Houston, Ft. Worth, Lone Star, Tex.	5.675 S2	5.675 S2		6.725 S2		8.175 S2	5.20 S2 5.45 L3		7.30 S2	7.725 S2	7.90 S2

STEEL PRICES

Key to Steel Producers

With Principal Offices

- A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Clam Metals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chapel Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme Newport Steel Co., Newport, Ky.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wyckoff Spencer Steel Div., Buddison, Pa.
B7 A. M. Byers, Pittsburgh

C1 Catstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C5 Colorado Fuel & Iron Corp., Denver
C6 Columbia Genesis Steel Div., San Francisco
C8 Columbia Steel & Shifting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shifting Co., Readsville, Mass.
C15 C. O. Carlson, Inc., Thornhale, Pa.
C16 Connors Steel Div., Birmingham
C17 Chester Blast Furnace, Inc., Chester, Pa.

D1 Detroit Steel Corp., Detroit
D2 Dearborn Div., Sharon Steel Corp.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Fifth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Folland Steel Corp., Folland, W. Va.

- G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessup Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLaughlin Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M5 Mystic Iron Works, Everett, Mass.
M6 Milson Steel Products Div., Milson, Pa.
M8 Mill Strip Products Co., Evanston, Ill.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Northeastern Steel Corp., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit

- P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Strip Steel Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebing Sons Co., John A., Trenton, N. J.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Tunkin Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING

Base discounts pct. f.o.b. mills. Base price about \$200 per net ton.

	BUTTWELD												SEAMLESS							
	1 In.		1 1/2 In.		2 In.		2 1/2 In.		3 In.		3 1/2 In.		4 In.		5 In.		6 In.		8 In.	
STANDARD T & C	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.
Sparrows Pt. B3	3.75	12.0	6.25	8.0	9.75	13.50	12.25	14.75	12.75	15.25	14.75	15.25	14.75	15.25	14.75	15.25	14.75	15.25	14.75	15.25
Youngstown R3	5.25	10.0	8.25	10.0	11.75	15.50	14.25	16.75	14.25	16.75	14.25	16.75	14.25	16.75	14.25	16.75	14.25	16.75	14.25	16.75
Fontana K1	8.25	23.5	5.25	19.5	1.75	15.00	0.75	14.25	1.25	13.25	1.75	12.75	3.25	13.00						
Pittsburgh J3	5.25	16.0	8.25	10.0	11.75	1.50	14.25	0.75	14.75	0.25	15.25	0.75	16.75	0.50	*9.25	*24.25	*2.75	+19.50	*0.25	+17.0
Alton, Ill. I1	3.25	12.0	6.25	8.0	9.75	3.50	12.25	2.75	12.75	1.75	13.25	1.25	14.75	1.50						
Sharon M1	5.25	10.0	8.25	10.0	11.75	1.50	14.25	0.75	14.75	0.25	15.25	0.75	16.75	0.50						
Fairless N2	3.25	12.0	6.25	8.0	9.75	3.50	12.25	2.75	12.75	1.75	13.25	1.25	14.75	1.50						
Pittsburgh N1	5.25	10.0	8.25	10.0	11.75	1.50	14.25	0.75	14.75	0.25	15.25	0.75	16.75	0.50	*9.25	*24.25	*2.75	+19.50	*0.25	+17.0
Wheeling W3	5.25	10.0	8.25	10.0	11.75	1.50	14.25	0.75	14.75	0.25	15.25	0.75	16.75	0.50						
Wheatland H4	5.25	10.0	8.25	10.0	11.75	1.50	14.25	0.75	14.75	0.25	15.25	0.75	16.75	0.50	*9.25	*24.25	*2.75	+19.50	*0.25	+17.0
Youngstown Y1	5.25	10.0	8.25	10.0	11.75	1.50	14.25	0.75	14.75	0.25	15.25	0.75	16.75	0.50						
Indiana Harbor Y1	1.25	11.0	2.25	2.0	10.75	2.50	13.25	1.75	13.75	1.25	14.25	0.75	16.75	1.00						
Loran N2	5.25	10.0	8.25	10.0	11.75	1.50	14.25	0.75	14.75	0.25	15.25	0.75	16.75	0.50	*9.25	*24.25	*2.75	+19.50	*0.25	+17.0
EXTRA STRONG PLAIN ENDS																				
Sparrows Pt. B3	7.75	6.0	11.75	2.0	14.75	2.50	15.25	1.25	15.75	2.25	16.25	2.75	16.75	1.50						
Youngstown R3	9.75	4.0	13.75	1st	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50						
Fairless N2	7.75	6.0	11.75	2.0	14.75	2.50	15.25	1.25	15.75	2.25	16.25	2.75	16.75	1.50						
Fontana K1	3.75	3.25	3.25	3.25	3.25	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75						
Pittsburgh J3	9.75	4.0	13.75	1st	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50	*7.75	*21.75	*0.25	+16.0	2.25	+13.50
Alton, Ill. I1	7.75	6.0	11.75	2.0	14.75	2.50	15.25	1.25	15.75	2.25	16.25	2.75	16.75	1.50						
Sharon M1	9.75	4.0	13.75	1st	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50						
Pittsburgh N1	9.75	4.0	13.75	1st	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50	*7.75	*21.75	*0.25	+16.0	2.25	+13.50
Wheeling W3	9.75	4.0	13.75	1st	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50						
Wheatland H4	9.75	4.0	13.75	1st	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50						
Youngstown Y1	9.75	4.0	13.75	1st	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50	*7.75	*21.75	*0.25	+16.0	2.25	+13.50
Indiana Harbor Y1	8.75	5.0	12.75	1.0	15.75	3.50	16.25	2.25	16.75	3.25	17.25	3.75	17.75	2.50						
Loran N2	9.75	4.0	13.75	1st	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50	*7.75	*21.75	*0.25	+16.0	2.25	+13.50

Threads only, butt weld and seamless 2 1/2 in. pt. higher discount. Plain ends, butt weld and seamless, 3-in. and under, 5 1/2 in. pt. higher discount.
Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: 1/2, 3/4 and 1-in., 2 pt.; 1 1/2, 1 3/4 and 2-in., 1 pt.; 2 1/2 and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2 1/2 and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts.
East St. Louis zinc price now 10¢ per lb.

(Effective Nov. 4, 1957)

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	\$1.74	T-1
18	4	1	—	5	2.445	T-4
18	4	1	—	—	1.905	T-2
1.5	4	1.5	8	—	1.19	M-1
6	4	3	6	—	1.49	M-3
6	4	2	5	—	1.245	M-2
High-carbon chromium						D-3, D-5
Oil-hardened manganese						O-2
Special carbon						W-1
Extra carbon						W-1
Regular carbon						W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b.

Cladding	Plate (A3, J2, L4)			Sheet (J2)
	10 pct	15 pct	20 pct	
302				37.50
304	37.95	42.25	46.70	40.00
316	44.40	49.50	54.50	58.75
321	40.05	44.60	49.30	47.25
347	42.40	47.55	52.80	57.00
405	29.85	33.35	36.85	
410	29.55	33.10	36.70	
430	29.80	33.55	37.25	

CR Strip (S9) Copper, 10 pct, 2 sides, 40.25; 1 side, 33.95.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Unthreaded
Bessemer U/I	5.525	6.50	6.975				
Cleveland R1				9.75			14.75
So. Chicago R1							
Ensley T2	5.525	6.50					
Fairfield T2		6.50		9.75	6.50		
Gary U/I	5.525				6.50		
Huntington C16		6.50					
Ind. Harbor I1	5.525		6.975	9.75		6.60	
Ind. Harbor Y1				9.75			
Johnstown B1		6.50					
Joliet U/I			5.975				
Kansas City S2				9.75		14.75	
Lackawanna B1	5.525	6.50	6.975		6.60		
Lebanon R1			6.975		11.50	11.75	
Minneapolis C6	5.525	7.00	6.975	9.75	6.60	11.75	
Pittsburgh P5							
Pittsburgh F3				10.25	6.75	15.75	
Seattle R7					6.60		
Stedton R1	5.525		6.975				
Struthers Y1				9.75			
Torrance C7					6.75		
Williamsport S1		6.50					
Youngstown R2				9.75			

COKE

Furnace, beehive (f.o.b.) Net-Ton
Connellsville, Pa. \$15.00 to \$15.75
Foundry, beehive (f.o.b.) \$17.50 to \$19.00

Foundry oven coke	
Buffalo, del'd	\$31.75
Detroit, f.o.b.	30.50
New England, del'd	31.55
Kearney, N. J., f.o.b.	29.75
Philadelphia, f.o.b.	29.50
Swedeland, Pa., f.o.b.	29.50
Painesville, Ohio, f.o.b.	30.50
Erie, Pa., f.o.b.	30.50
Cleveland, del'd	32.65
Cincinnati, del'd	31.84
St. Paul, f.o.b.	29.75
St. Louis, f.o.b.	31.50
Birmingham, f.o.b.	28.85
Milwaukee, f.o.b.	30.50
Neville, Is., Pa.	29.25

LAKE SUPERIOR ORES

51.50% Fe natural content, delivered lower Lake ports. Prices for 1957 season. Freight charges for seller's account.

Gross Ton	
Open-hearth lump	\$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

ELECTRICAL SHEETS

22-Gage	Hot-Rolled		Cold-Reduced (Coiled or Cut Length)	
	F.o.b. Mill Cents Per Lb	(Cut Lengths)*	Semi- Processed	Fully Processed
Field			9.625	
Armature	11.10		10.85	11.35
Elect.	11.80		11.55	12.05
Hermetic			12.10	
Motor	12.90		12.65	13.15
Dynamo	13.95		13.70	14.20
Trans. 72	15.00		14.75	15.25
Trans. 65	15.55			
Grain Oriented				
Trans. 58	16.05		Trans. 80	19.20
Trans. 52	17.10		Trans. 73	19.70

Producing points: Beech Bottom (W5); Brackenridge (A5); Granite City (G2); Indiana Harbor (I1); Mansfield (L2); Newport, Ky. (N3); Niles, O. (N6); Vandergrift (U1); Warren, O. (R5); Zanesville, Butler (A7).

ELECTRODES

Cents per lb, f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE			CARBON*		
Diam. (In.)	Length (In.)	Price	Diam. (In.)	Length (In.)	Price
24	84	26.00	40	100, 110	10.70
20	72	25.25	35	110	10.70
18	72	25.75	30	110	10.85
14	72	25.25	24	72 to 84	11.25
12	72	26.25	20	90	11.00
10	60	28.00	17	72	11.40
10	48	28.50	14	72	11.85
7	60	28.25	12	60	12.95
6	60	31.50	10	60	13.00
4	40	35.00	8	60	13.30
3	40	37.00			
2	30	39.25			
2	24	60.75			

* Prices shown cover carbon nipples.

REFRACTORIES

Fire Clay Brick

First quality, Ill., Ky., Md., Mo., Ohio, Pa.
(except Salina, Pa., add \$3.00) \$135.00
No. 1 Ohio 120.00
Sec. Quality, Pa., Md., Ky., Mo., Ill.
No. 2 Ohio 103.00
Ground fire clay, net ton, bulk
(except Salina, Pa., add \$2.00) 21.50

Silica Brick

Mt. Union, Pa., Ensley, Ala. \$150.00
Childs, Hays, Pa. 155.00
Chicago District 160.00
Western Utah 175.00
California 180.00
Super Duty

Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville

Silica cement, net ton, bulk, Latrobe 28.50
Silica cement, net ton, bulk, Chicago 25.50
Silica cement, net ton, bulk, Ensley, Ala. 26.50
Silica cement, net ton, bulk, Mt. Union 24.50
Silica cement, net ton, bulk, Utah and Calif. 37.00

Chrome Brick

Standard chemically bonded, Balt. \$105.00
Standard chemically bonded, Cincinnati, Calif. 115.00
Burned, Balt. 99.00

Magnesite Brick

Standard Baltimore \$131.00
Chemically bonded, Baltimore 116.00

Grain Magnesite

St. 3/4 to 1/2-in. grains
Domestic, f.o.b. Baltimore in bulk \$73.00
Domestic, f.o.b. Chewah, Wash.,
Luning, Nev.
in bulk 46.00
in sacks 52.00-54.00

Dead Burned Dolomite

Per net ton
F.o.b. bulk, producing points in:
Pa., W. Va., Ohio \$16.75
Midwest 17.00
Missouri Valley 15.00

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard O Coated Nails		Woven Wire Fence		Fence Posts		Single Loop Bale Ties		Galv. Barbed and Twisted Barbed Wire		March Wire Ann'd		Merchant Wire Galv.	
	Col	Col	Col	Col	Col	Col	Col	Col	Col	Col	Col	Col	Col	Col
Alabama City R1	173	187			212	193			8.65	9.20				
Alquippa J1***	173	190			219	203			8.65	9.325**				
Atlanta J8**	175				208	199			8.50	9.10				
Bartonville K2**	175	192			178	214	198		8.75	9.425**				
Buffalo B6									8.65	8.95*				
Chicago N4***														
Cleveland A6									8.65					
Cleveland A5									8.75	9.425				
Crawfords M4**	175	192			214	198			8.65	9.20				
Donora, Pa. A5	173	187			212	193			8.65	9.20				
Duluth A5	173	187			212	193			8.65	9.20				
Fairfield, Ala. T2	173	187			212	193			8.65	9.20				
Galveston D4	9.10													
Houston S2	178	192			217	198			8.90	9.45				
Jacksonville M9	184	197			219	203			9.00	9.675				
Johnston B3**	173	190			172	196*			8.65	9.325**				
Joliet, Ill. A5	173	187			212	193			8.65	9.20				
Kokomo C9*	175	189			214	195*			8.75	9.30*				
L. Angeles B2***									9.60	10.275				
Kansas City S2*	178	192			217	198*			8.90	9.45*				
Minneapolis C6*	178	192			177	217	198		8.90	9.45*				
Monessen P6									193	8.65	9.20			
Palmers, Mass. B6									8.95	9.50*				
Pittsburg, Cal. C7	192	210			213				9.60	10.15				
Rankin, Pa. A5	173	187			213				8.65	9.20				
So. Chicago R1	173	187			193				8.65	9.20				
S. San Fran. C6*					236				9.60	10.15*				
Sparrows Pt. B1**	175				214	198			8.75	9.425				
Struthers, O. Y1*									8.65	9.30				
Worcester A5	179								8.95	9.50				
Williamsport S5														

* Zinc less than .10¢.

** 11-12¢ zinc.

*** .10¢ zinc.

† Plus zinc extras.

‡ Wholesalers only.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT				
	0.26	0.41	0.61	0.81	1.06
Baltimore, Md. T8	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. W12		10.70	12.90	16.10	19.30
Boston T8	9.50	10.70	12.90	15.90	18.85
Buffalo, N. Y. R7	8.95	10.40	12.60	15.60	18.55
Carnegie, Pa. S9	8.95	10.40	12.60	15.60	18.55
Cleveland A5	8.95	10.40	12.60	15.60	18.55
Dearborn S1	9.05	10.50	12.70		
Detroit D1	9.05	10.50	12.70	15.70	
Detroit D2	9.05	10.50	12.70		
Dover, O. G3	8.95	10.40	12.60	15.60	18.55
Evansville, Ill. M8	9.05	10.50	12.70	15.75	18.40
Franklin Park, Ill. T8	9.05	10.50	12.70	16.10	19.30
Harrison, N. J. C11	9.10	10.55	12.60	15.60	18.55
Indianapolis J1	9.10	10.55	12.60	15.60	18.55
Los Angeles C1	11.15	12.60	14.80	17.80	
New Castle, Pa. B4	8.95	10.40	12.60	15.60	
New Haven, Conn. D1	9.40	10.70	12.90	15.90	
Pawtucket, R. I. N7	9.50	10.70	12.90	15.90	18.85
Pittsburgh S7	8.95	10.40	12.60	15.60	18.55
Riversdale, Ill. A1	9.05	10.40	12.60	15.60	18.55
Sharon, Pa. S1	8.95	10.40	12.60	15.60	18.55
Trenton, R4		10.70	12.90	16.10	19.30
Wallingford W1	9.40	10.70	12.90	15.90	18.55
Warren, Ohio T4	8.95	10.40	12.60	15.60	18.75
Worcester, Mass. A5	9.50	10.70	12.90	15.90	18.85
Youngstown J1	8.95	10.40	12.60	15.60	18.55

BOILER TUBES

\$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size		Seamless		Elec. Weld
	OD- In.	B.W. Ga.	H.R.	C.D.	
Babcock & Wilcox	2	13	36.34	42.56	35.22
	2 1/2	12	48.94	57.31	47.43
	3	12	56.51	66.18	54.77
	3 1/2	11	65.97	77.25	63.93
	4	10	87.61	102.59	85.53
National Tube	2	13	36.34	42.56	35.22
	2 1/2	12	48.94	57.31	47.43
	3	12	56.51	66.18	54.77
	3 1/2	11	65.97	77.25	63.93
	4	10	87.61	102.59	85.53
Pittsburgh Steel	2	13	36.34	42.56	
	2 1/2	12	48.94	57.31	
	3	12	56.51	66.18	
	3 1/2	11	65.97	77.25	
	4	10	87.61	102.59	

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Pct. Discounts

Machine and Carriage Bolts	Full Case Price	30 Cps. tainers	20,000 Lb.	40,000 Lb.
$\frac{1}{2}$ " and smaller x 6" and shorter	49	54	56	57
$\frac{3}{4}$ " thru 1" x longer than 6"	35	40	43	45
Roller thread carriage bolts $\frac{1}{2}$ " & smaller x 6" and shorter	49	54	56	57
Lag, all diam. x 6" & shorter	49	54	56	57
Lag, all diam. longer than 6"	39	44½	47	48½
Flow bolts $\frac{1}{2}$ " and smaller x 6" and shorter	49	54	56	57

(Add 25 pct for broken case quantities)

Nuts, Hex, HP reg. & hvy.	Full case or Keg price
$\frac{1}{2}$ " in. or smaller	60½
$\frac{3}{4}$ " in. to 1 in. inclusive	55½
1½ in. to 1½ in. inclusive	58½
1½ in. and larger	53½

C. P. Hex, reg. & hvy.	
$\frac{1}{2}$ " in. and smaller	60½
$\frac{3}{4}$ " in. to 1½ in. inclusive	55½
1½ in. and larger	53½

Hot Galv. Hex Nuts (All Types)	
$\frac{1}{2}$ " in. and smaller	46½

Semi-finished Hex Nuts	
$\frac{1}{2}$ " in. or smaller	60½
$\frac{3}{4}$ " in. to 1½ in. inclusive	55½
1½ in. and larger	53½

Finished	
$\frac{1}{2}$ " in. and smaller	63

Rivets	Base per 100 lb
$\frac{1}{2}$ " in. and larger	\$12.25
7/16 in. and smaller	19

Cap Screws	Discount (Packages)
Full Finished H. C. Heat Treat	
New std. hex head, packaged	
$\frac{1}{4}$ " diam. and smaller x 6" and shorter	40 26
$\frac{1}{4}$ ", $\frac{3}{8}$ ", and 1" diam. x 6" and shorter	22 3
$\frac{1}{4}$ " diam. and smaller x longer than 6"	8 +13
$\frac{3}{8}$ ", $\frac{1}{2}$ ", and 1" diam. x longer than 6"	+6 +22
C-1018 Steel Full-Finished Cartons Bulk	
$\frac{1}{4}$ " through $\frac{3}{8}$ " dia. x 6" and shorter	58 49
$\frac{1}{4}$ " through 1" dia. x 6" and shorter	45 33
Minimum quantity— $\frac{1}{4}$ " through $\frac{3}{8}$ " diam., 1,000 pieces; $\frac{1}{2}$ " through $\frac{3}{4}$ " diam., 5,000 pieces; $\frac{3}{4}$ " through 1" diam., 2,000 pieces	

Machine Screws & Stove Bolts	Discount
Plain Finish	Mach. Screws 19 Stove Screws 32
Cartons Bulk	Quantity
To $\frac{1}{4}$ " diam. incl.	25,000-200,000 9 54
5/16 to $\frac{1}{2}$ " diam. incl.	25,000-200,000 9 54
All diam. over 3/8" long	5,000-100,000 — 54

Machine Screws & Stove Bolt Nuts	Discount
In Cartons	Hex 16 Square 19
To Bulk	Quantity
$\frac{1}{4}$ " diam. & smaller	15,000-100,000 7 9

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.7
Chicago	140.9
San Francisco-L. A.	148.6

Free 1952, value, Class B or heavier

5 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1952, issue.

Source: U. S. Pipe and Foundry Co.

ELECTROPLATING SUPPLIES

Anodes	
(Cents per lb, frt allowed in quantity)	
Copper	
Rolled elliptical, 18 in. or longer, 5000 lb lots	45.00
Electrodeposited	36.25
Brass, 80-20, ball anodes, 2000 lb or more	44.00
Zinc, ball anodes, 2000 lb lots	17.50
(for elliptical add 1¢ per lb)	
Nickel, 99 pct plus, rolled carbon, 5000 lb	102.25
(Rolled depolarized add 3¢ per lb)	
Cadmium	1.70
Tin, ball anodes and elliptical	\$1.13 per lb.
Chemicals	
(Cents per lb, f.o.b. shipping point)	
Copper cyanide, 100 lb drum	73.20
Copper sulphate, 100 lb bags, per cwt.	24.35
Nickel salts, single, 100 lb bags	40.50
Nickel chloride, freight allowed, 200 lb	45.50
Sodium cyanide, domestic, f.o.b. N. Y., 200 lb drums	23.05
(Philadelphia price 23.30)	
Zinc cyanide, 100 lb drum	59.00
Potassium cyanide, 100 lb drum	48.00
N. Y.	
Chromic acid, flake type, 10,000 lb or more	31.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, net minus 100 mesh	
Swedish sponge iron, del. East of Miss. River, ocean bags, 23,000 lb. and over	10.5¢
F.O.B. Riverton or Camden, New Jersey, freight allowed west of Miss. River	9.5¢
Domestic sponge iron, 98+½% Fe, 23,000 lb. and over del'd East of Miss. River	10.5¢
F.O.B. Riverton, New Jersey, West of Miss. River	9.5¢
Canadian sponge iron, del'd in East, carloads	12.5¢
Electrolytic iron, annealed, imported 99.5+½% Fe	27.5¢
domestic 99.5+½% Fe	36.5¢
Electrolytic iron, unannealed, minus 325 mesh, 99+½% Fe	57.0¢
Electrolytic iron, melting stock, 99.81% pure	22.0¢
Carbonyl iron size 3 to 20 micron, 98½, 99.8+½% Fe, 88.0¢ to \$2.85	
Aluminum, freight allowed	38.00¢
Brass, 10 ton lots	31.1¢ to 47.1¢
Copper, electrolytic	41.50¢
Copper, reduced	40.3¢ to 48.8¢
Cadmium, 100-199 lb. 95¢ plus metal value	
Chromium, electrolytic, 99.85% min. Fe, 0.3 max. Del'd	\$5.00
Lead	21.50¢ lb, f.o.b. plant
Manganese f.o.b. Extron, Pa.	46.0¢
Molybdenum, 99%	\$3.60 to \$3.95
Nickel, chemically precipitated	\$1.05
Nickel, unannealed	\$1.00
Nickel, annealed	\$1.06
Nickel, spherical, unannealed	\$1.13
Silicon	43.50¢
Solder powder	13¢ plus met. value
Stainless steel, 302	\$1.02
Stainless steel, 316	\$1.30
Tin	14.00¢ plus metal value
Tungsten, 99% (65 mesh) \$3.75 (nominal)	
Zinc, 5000 lb & over	17.5¢ to 30.7¢

WARE-HOUSES

		Metropolitan Price, dollars per 100 lb.											
		Sheets			Strip	Plates	Shapes		Bars		Alloy Bars		
Cities	City Delivery Charge	Hot-Rolled (15 ga. & over)	Cold-Rolled (15 ga.)	Galvanized (10 ga. & over)	Hot-Rolled		Standard Structural	Hot-Rolled (merch.)	Cold-Finished	Hot-Rolled 4615	Hot-Rolled 4615 As rolled	Cold-Drawn 4615 As rolled	Cold-Drawn 4148 Annealed
Atlanta		8.59	9.87	10.13	8.64	8.97	9.05	9.01	10.68				
Baltimore	\$1.10	8.38	8.88	9.71	8.86	8.76	9.29	9.16	11.44	16.18	15.18	19.73	18.98
Birmingham	.15	8.18	9.45	10.15	8.23	8.56	8.64	8.60	10.57				
Boston	.10	9.48	10.54	11.55	9.52	9.82	9.73	9.83	13.00	15.79	15.38	19.89	19.18
Buffalo	.15	8.40	9.15	11.22	8.65	9.05	9.05	8.95	11.05	16.34	15.15	19.01	18.95
Chicago	.15	8.35	9.60	10.15	8.38	8.71	8.79	8.75	8.95	15.80	14.80	19.35	18.60
Cincinnati	.15	8.49	9.65	10.20	8.69	9.08	9.33	9.07	9.46	15.61	15.11	18.96	18.91
Cleveland	.15	8.33	9.60	10.10	8.48	8.94	9.16	8.84	10.95	15.89	14.89	19.44	18.96
Denver	.20	9.70	11.30	12.49	9.80	9.70	9.80	9.98	10.65			17.60	
Detroit	.15	8.58	9.85	10.50	8.73	9.06	9.33	9.05	9.30	15.46	15.06	18.81	18.86
Houston		8.45	9.75		8.60	9.05	8.60	8.55	11.10	16.20	19.30	19.05	
Kansas City	.20	9.02	10.27	10.07	9.05	9.38	9.46	9.42	9.87	20.02	15.47	20.02	19.27
Los Angeles	.10	9.60	10.85	11.75	9.65	9.65	9.20	9.65	12.85	17.25	16.10	21.05	19.25
Memphis	.15	8.02	9.22		8.12	8.35	8.39	8.25	9.85				
Milwaukee	.15	8.48	9.73	10.28	8.51	8.84	9.00	8.88	9.18	15.43	14.93	18.78	18.73
New York	.10	8.97	10.23	10.66	9.41	9.53	9.45	9.67	12.86	15.02	15.19	18.42	18.99
Norfolk	.20	8.00			8.40	8.35	8.70	8.45	10.70				
Philadelphia	.10	8.10	9.00	9.97	8.79	8.87	8.60	8.75	11.61	15.61	15.11	18.96	18.91
Pittsburgh	.15	8.33	9.60	10.50	8.48	8.71	8.79	8.75	10.95	15.80	14.80	19.35	18.60
Portland		9.50	11.20	11.55	9.05	8.30	9.65	9.65	14.65	18.50	16.10	20.75	20.25
San Francisco	.10	9.45	10.85	11.10	9.55	9.70	9.60	9.80	13.10	17.05	16.10	21.05	20.35
Seattle		9.95	11.15	12.00	10.00	9.70	9.80	10.80	14.05	16.55	16.35	20.65	20.15
Spokane	.15	10.10	11.30	12.15	10.15	9.85	9.95	10.25	14.20		17.35	21.55	21.05
St. Louis	.15	8.69	9.94	10.51	8.74	9.08	9.25	9.12	9.56	15.66	15.16	19.01	18.96
St. Paul	.15	8.94	10.19	10.76	8.99	9.45	9.53	9.37	9.81		15.26		19.06

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 1999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other or with galvanized sheets for quantity.

†† 10¢ zinc. ‡ Deduct for country delivery. † 3/16 in. to 1/2 in. * C1018—1 in. rounds.

(Effective Nov. 4, 1957)

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mail.	Beas.	Low Phos.
Birdsboro, Pa. B6	68.00	68.50	69.00	69.50	
Birmingham R1	62.00	62.50*			
Birmingham W9	62.00	62.50*	66.50		
Birmingham U4	62.00	62.50*	66.50		
Buffalo R1	66.00	66.50	67.00	67.50	
Buffalo H1	66.00	66.50	67.00	67.50	
Buffalo W6	66.00	66.50	67.00	67.50	
Chester P2	66.50	67.00	67.50		
Chicago I4	66.00	66.50	66.50	67.00	
Cleveland A5	66.00	66.50	66.50	67.00	71.00†
Cleveland R1	66.00	66.50	66.50	67.00	
Duluth I4	66.00	66.50	66.50	67.00	71.00†
Erie I4	66.00	66.50	66.50	67.00	71.00†
Everett M6	67.50	68.00	68.50		
Fontana K1	75.00				
Geneva, Utah C7	66.00	66.50			
Granite City G2	67.90	68.40	68.90		
Hubbard Y1			66.50		
Ironton, Utah C7	66.00	66.50			
Midland C11	66.00				
Minnequa C6	68.00	68.50	69.00		
Monessen P6	66.00				
Neville Is. P4	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda T1	66.00	66.50	67.00	67.50	
Sharpville S1	66.00	66.50	66.50	67.00	
So. Chicago R3	66.00	66.50	66.50		
So. Chicago W8	66.00	66.50	66.50	67.00	
Swedeland A2	68.00	68.50	69.00	69.50	
Toledo I4	66.00	66.50	66.50	67.00	
Troy, N. Y. R1	68.00	68.50	69.00	69.50	74.00
Youngstown Y1			66.50	67.00	

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, 52¢ per ton for 0.50 to 0.75 pct nickel, \$1 for each additional 0.25 pct nickel. Add \$1.00 for 0.31-0.69 pct phos.

Silvery Iron: Buffalo (6 pct), H1, \$79.25; Jackson J1, I4 (Globe Div.), \$78.00; Niagara Falls (15.01-15.50), \$101.00; Kokoh (14.01-14.50), \$103.50; (15.51-16.00), \$106.50. Add \$1.00 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 18 pct. Add \$1.25 for each 0.50 pct manganese over 1.00 pct. Bessemer silvery pig iron (under .10 pct phos.): \$64.00. Add \$1.00 premium for all grades silvery to 18 pct.

† Intermediate low phos.

STAINLESS STEEL

Base price cents per lb f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.00	23.75	23.25	25.25	—	27.00	39.75	32.25	37.00	—	16.75	—	17.00
Slabs, billets	27.00	27.00	28.00	31.50	32.00	33.25	49.50	40.00	46.50	—	21.50	—	21.75
Billets, forging	—	36.50	37.25	38.00	41.00	40.50	62.25	47.00	55.75	32.00	28.25	28.75	28.75
Bars, struct.	42.00	43.00	44.25	45.00	48.00	47.75	73.00	55.50	64.75	37.75	33.75	34.25	34.25
Plates	44.25	45.00	46.25	47.25	50.00	50.75	76.75	59.75	69.75	40.25	35.00	36.75	36.00
Sheets	48.50	49.25	51.25	52.00	—	55.50	81.50	65.50	79.25	48.25	40.25	—	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	44.25	69.25	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	—	55.50	81.50	65.50	79.25	48.25	40.25	—	40.75
Wire CF; Rod HR	40.00	40.75	42.00	42.75	45.50	45.25	69.25	52.50	61.50	35.75	32.00	32.50	32.50

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., C11; Brackenridge, Pa., A3; Butler, Pa., A7; Vandergrift, Pa., U1; Washington, Pa., W2, J2; Baltimore, Et; Middletown, O., A7; Massillon, O., R3; Gary, U1; Bridgeville, Pa., U2; New Castle, Ind., J2.

Strip: Midland, Pa., C11; Waukegan, Cleveland, A5; Carnegie, Pa., S9; McKeesport, Pa., F1; Reading, Pa., C2; Washington, Pa., W2; W. Leeburg, Pa., A5; Bridgeville, Pa., U2; Detroit, M2; Canton Massillon, O., R3; Harrison, N. J., D3; Youngstown, J3; Sharon, Pa., S1; Butler, Pa., A7; Wallingford, Conn., U3 (plus further conversion extras); W1; New Bedford, Mass. (.25¢ per lb higher), R6; Gary, U1 (.25¢ per lb higher).

Bars: Baltimore, A7; S. Duquesne, Pa., U1; Munhall, Pa., U1; Reading, Pa., C2; Titusville, Pa., U2; Washington, Pa., J2; McKeesport, Pa., U1, F1; Bridgeville, Pa., U2; Dunkirk, N. Y., A3; Massillon, O., R3; S. Chicago, U1; Syracuse, N. Y., C11; Watervliet, N. Y., A3; Waukegan, A5; Canton, O., T5, R3; Ft. Wayne, I4; Detroit, R3; Gary, U1.

Wire: Waukegan, A5; Massillon, O., R3; McKeesport, Pa., F1; Ft. Wayne, J4; Harrison, N. J., D3; Baltimore, A7; Dunkirk, A3; Monessen, P1; Syracuse, C11; Bridgeville, U2.

Structurals: Baltimore, A7; Massillon, O., R3; Chicago, Ill., J4; Watervliet, N. Y., A3; Syracuse, C11; S. Chicago, U1.

Plates: Brackenridge, Pa., A5; Chicago, U1; Munhall, Pa., U1; Midland, Pa., C11; New Castle, Ind., J2; Middletown, A7; Washington, Pa., J2; Cleveland, Massillon, R3; Coatesville, Pa., C15; Vandergrift, Pa., U1; Gary, U1.

Forging billets: Midland, Pa., C11; Baltimore, A7; Washington, Pa., J2; McKeesport, F1; Massillon, Canton, O., R3; Watervliet, A3; Pittsburgh, Chicago, U1; Syracuse, C11; Detroit, R3; Munhall, Pa., S. Chicago, U1.

(Effective Nov. 4, 1957)

Weight—
29,500 lbs.



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Combination block and tackle with lever arm action.

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No stiffening plates or braces to collect material.

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Positive scoop alignment. Hand automatic or electric trip available.

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Erie's exclusive open and close cycle is fast and sure.

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Hooks on or off in less than a minute.

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Overhead cranes, monorail hoists, locomotive cranes, ships' tackle.

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5117 Rudolph Ave. & NKP RR

Erie, Pennsylvania

FERROALLOY PRICES

Ferrochrome

Cents per lb contained Cr, lump, bulk, carloads, delfd, 67-71% Cr, 39-1.09% max. Si.

0.02% C	41.00	0.50% C	38.00
0.05% C	39.00	1.00% C	37.75
0.10% C	38.50	1.50% C	37.50
0.20% C	38.25	2.00% C	37.25
4.00-4.50% C, 60-70% Cr, 1-2% Si	28.75		
3.50-4.00% C, 57-61% Cr, 2.00-4.50% Si	27.50		
0.02% C (Simplex)	36.75		
8.00% max C, 50-55% Cr, 3-6% max Si	25.00		
8.50% max C, 50-55% Cr, 3% max Si	25.00		

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max. 0.10% N price schedule. Add 5¢ for each additional 0.25% of N.

Chromium Metal

Per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C	\$1.31
0.50% max. C	1.31
2 to 11% C, 88-91% Cr, 0.75% Fe	1.40

Electrolytic Chromium Metal

Per lb of metal 2" x D plate (1/2" thick) delivered packed, 99.80% min. Cr, (Metallic Base) Fe 0.20 max.

Carloads	\$1.29
Ton lots	1.31
Less ton lots	1.33

Low Carbon Ferrochrome Silicon

Cr 34-41%, Si 42-45%, C 0.05% max. Carloads, delivered, lump, 3-in. x down, packed.

Price is sum of contained Cr and contained Si.

	Cr	Si
Carloads	27.50	14.20
Ton lots	27.75	15.65
Less ton lots	34.35	17.30

Calcium-Silicon

Per lb of alloy, lump, delivered, packed, 20-32% Cr, 60-65% Si, 3.00 max. Fe.

Carloads	25.65
Ton lots	27.95
Less ton lots	29.45

Calcium-Manganese-Silicon

Cents per lb of alloy, lump, delivered, packed.

16-20% Ca, 14-18% Mn, 53-59% Si	24.25
Ton lots	26.15
Less ton lots	27.15

SMZ

Cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe 1/2 in. x 12 mesh.

Ton lots	21.15
Less ton lots	22.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. Si 1.00%, V 50-55%, Cr 17-19%, Si 8-11% Mn, packed.

Carload lots	17.20
Ton lots	18.70
Less ton lots	19.95

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. Si 1.00%, Cr 18 to 22%, Ti 9 to 11%, Cr 3 to 7%.

Carload packed	18.50
Ton lots to carload packed	19.65
Less ton lots	20.90

Ferromanganese

Maximum base price, f.o.b. lump size, base content 74 to 76 pct Mn.

Producing Point	Cents per lb
Marietta, Ashland, O., Alloy	
W. Va. Sheffield, Ala. Portland	12.25
Johnstown, Pa.	12.25
Sheridan, Pa.	12.25
Philo, Ohio	12.25
S. Duquesne	12.25

Add or subtract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn	14.80
Carloads, bulk	17.20
Ton lots packed	17.20

Spiegeleisen

Per gross ton, lump, f.o.b. Palmerton, Pa.

Manganese	Silicon	Price
16 to 12%	3% max.	\$100.50
19 to 21%	3% max.	102.50
21 to 23%	3% max.	105.00

Manganese Metal

2 in. x down, cents per pound of metal delivered.

35.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe	
Carload, packed	45.75
Ton lots	47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads	34.00
Ton lots	36.00
250 to 1999 lb	38.00
Premium for Hydrogen-removed metal	0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max., carloads, lump, bulk, delivered, per lb of contained Mn

	25.50
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Low-Carb Ferromanganese

Cents per pound Mn contained, lump size, delfd Mn 85-90%.

Carloads	Ton	Less
0.07% max. C, 0.00%	37.15	39.95
1, 90% Mn	35.10	37.90
0.07% max. C	34.35	37.15
0.10% max. C	33.60	36.40
0.12% max. C	32.85	35.65
0.30% max. C	31.60	34.40
0.50% max. C	31.60	34.40
0.75% max. C, 80-85% Mn, 5.0-7.0% Si	28.60	31.40

Silicomanganese

Lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢ f.o.b. shipping point.

Carloads bulk	12.80
Ton lots, packed	14.45
Briquet contract basis carloads, bulk, delivered, per lb of briquet	15.10
Ton lots, packed, pallets	16.50

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., \$106.50 gross ton, freight allowed to normal trade area, Si 15.00 to 15.50 pct, f.o.b. Niagara Falls, N. Y., \$93.00.

Silicon Metal

Cents per pound contained Si, lump size, delivered, packed.

	Ton lots, packed	Carloads, packed
96.75% Si, 1.25% Fe	24.20	22.90
98% Si, 0.75% Fe	24.95	23.65

Silicon Briquets

Cents per pound of briquets, bulk, delivered, 99% Si, 2 lb Si, briquets.

Carloads, bulk	7.70
Ton lots, packed	10.50

Electric Ferrosilicon

Cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si	13.00	75% Si	16.40
65% Si	15.25	85% Si	18.10
	90% Si		19.50

Ferrovanadium

50-55% V delivered, per pound, contained V, carloads, packed.

Openhearth	3.20
Crucible	3.30
High speed steel (Primus)	3.40

Calcium Metal

Eastern zone, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	\$2.95	\$2.95	\$3.75
Less ton lots	2.40	3.30	4.55

Alsiifer, 20% Al, 40% Si, 40% Fe, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads	10.65¢
Ton lots	11.80¢

Calcium molybdate, 43.6-46.6% f.o.b. Lancaster, Pa., per pound contained Mo

	\$1.28
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Ferrocolumbium, 50-50%, 2 in. x D, delivered per pound contained Cb.

Ton lots	\$4.90
Less ton lots	4.95

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, delfd ton lots, 2-in. x D per lb cont 80 plus Ta

	\$4.25
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Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Lancaster, Pa., per pound contained Mo.

	\$1.68
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Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, MT, Pleasant, Tenn., \$4.00 unitage, per gross ton

	\$90.00
10 tons to less carload	\$110.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti

	\$1.35
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Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti

	\$1.50
Less ton lots	\$1.54

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton

	\$240.00
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Ferrotungsten, 1/4 x down, packed, per pounds contained W, ton lots delivered

	\$2.60 (nominal)
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Molybde oxide, briquets per lb contained Mo, f.o.b. Lancaster, Pa.

	\$1.41
Gals, f.o.b. Washington, Pa., Lancaster, Pa.	\$1.38

Simanal, 20% Si, 20% Mn, 20% Al, f.o.b. Philo, Ohio, freight allowed per lb.

Carload, bulk lump	18.50¢
Ton lots, packed lump	20.50¢
Less ton lots	21.00¢

Vanadium oxide, 86-89% V₂O₅ per pound contained V₂O₅

	\$1.38
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Zirconium, per lb of alloy 35-40% f.o.b. freight allowed, carloads, packed

	27.25¢
12-15% delfd lump, bulk-carloads	9.25¢

Boron Agents

Borosil, per lb of alloy delfd, f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B

2000 lb carload	\$5.50
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Bortram, f.o.b. Niagara Falls, Ton lots per pound

	45¢
Less ton lots, per pound	50¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b. Suspension Bridge, N. Y., freight allowed.

Ton lots per pound	14.00¢
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Ferroboron, 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots.

F.o.b. Wash., Pa., Niagara Falls, N. Y., delivered 100 lb up	85
10 to 14% B	1.20
14 to 19% B	1.50
19% min. B	1.50

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over No. 1

	\$1.05
No. 79	50¢

Manganese-Boron, 75.00% Mn, 15.20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, delfd.

Ton lots	\$1.46
Less ton lots	1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delfd less ton lots

	2.15
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or STEEL"

THE CLEARING HOUSE

Sporadic Advances Made at Chicago

Used machinery market there either moving sideways or edging up at a slow rate.

Dealer inventories are fairly high but prices continue to hold at previous levels.

■ There's been some faltering in the upward march of used tool business in the Midwest even compared with the usually dull summer months.

And dealers are finding that the summer of 1957 is not a sales period to be recalled with regret. Some frankly admit they did better business during the warm months than they had expected.

High Dealer Inventories—There's been an advance during the fall from those strong summer sales levels. It's been mild, spotted with sudden lags in customer buying, and highlighted by spurts that faded away after a short run. But the movement continues upward. If there are dealer complaints they're probably due to fact some suppliers built up inventories higher than the market requires.

Result: A number of shops report stocks of used tools are at the strongest level in the past two years. One dealer who believes in quick turnover states he's got his biggest inventory in seven years.

Good Selection Offered—However, if inventories are high, they are not at dangerous levels. On the contrary, some shops have a fairly complete stock of late model tools for the first time in months. And they can show a potential customer a greater selection than before. A lot of the dealers feel more comfortable

with their increased stocks. They're glad they haven't reduced them to the sales-to-inventory ratio that's been customary over the last two years.

Other evidence showing that the market is relatively strong: Selling prices are holding at current levels. Reports describe some price cutting, both in reconditioned and rebuilt machines, but it represents only a small percentage of the sales picture. Also there's been an upturn in the inquiry rate, according to a number of the larger firms. It hasn't spread much yet, but the smaller shops often show a lag in new inquiry rates.

Smaller Shops Buying—Noticeable in the fall upturn is the fairly strong rate of buying by the smaller metalworking shops. The sales usually involve smaller pieces of equipment. A high percentage of it is toolroom material, but a surprising amount of rebuilt work has also been placed by the small used tool buyers.

Despite reports of a slowdown in West Coast activity, inquiries for equipment destined for there continue to come into the Midwest. In addition there have been shipments to the East Coast although not in the volume noted a year ago.

September Sales Up

Sales of used machine tools in September, the Machinery Dealers National Assn. reports, showed a 1.2 pct increase over August. Third quarter sales, however, dropped from second quarter levels by 15.2 pct. Third quarter business this year matched that of third quarter 1956.

CONSIDER GOOD USED EQUIPMENT FIRST

BENDING ROLLS

10' x 10" Ga. Bertech Initial Type
10' x 10" King Pyramid Type
12' x 10" Hilles & Jones Pyramid Type
16' x 10" Ransome Pyramid Type

BRAKE-LEAF TYPE

12' x 10" Dicks & Krump

BRAKE-PRESS TYPE

12' x 10" Cincinnati

CRANES-OVERHEAD ELECTRIC TRAVELING

3 ton PAH 56' Span 220 V D.C.
3 ton Cleveland 60' Span 115 Volt D.C.
8 ton PAH 55' Span 220 V D.C.
10 ton Shepard Niles 58' Span 140 V D.C.
10 ton Shaw 120' Span 230 Volt D.C.
15 ton Shepard Niles 52' Span 220 Volt D.C.
15 ton Shepard Niles 55' Span 220 440 A.C.
15 ton Niles 75' Span 220 V D.C.
20 ton PAH 55' Span 220 440 A.C.
20 ton MMAM 72' Span 220 Volt D.C.
20 ton With two 10 ton Trolleys
120 ton Shepard Niles 77' Span 220 V D.C.

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22 Alliance 15 & 40 Ton Capacity, 60' Span, Motors

CUT OFF MACHINE

22A Modern Automatic Cut Off Machine For Pipe, Tubing, Bars to 2" O.D.

DIEING MACHINE

150 ton Henry & Wright, 3" Stroke, Roll Feed Scrap

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10 to 25 Acme Axial National

HAMMERS-BOARD DROP-STEAM DROP-STEAM

FORGING
800 lb. to 20,000 lb. incl.

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2200k Manville Solid Die Single Stroke
211 Waterbury Farrel D80P, Cap. 8" x 6"

LEVELLERS-ROLLER

18" Torrington, 15 Rolls 2 1/2" dia.

32" Torrington, 19 Rolls 1 3/4" dia.

60" Aetna 17 Rolls 1 1/2" dia.

PLANNER

22' x 72" x 10" Dietrich & Harvey Four Head

10' Southwark 10 Press, Jarks, Cap. 1 1/2"

PRESSES-HYDRAULIC

500 ton HPM Fastraverse, Bed 36"x36"
1500 ton Bliss, 15" Stroke, Bed 49"x18"
1500 ton Mesa Steam Hydr. Forging Press
2000 ton Bliss 18" Stroke Bed Area 54"x54"
1500 Baldwin Lima Hamilton Hydr. Forging Press

PRESSES-STRAIGHT SIDE

100 ton Clearing F1100, 14" Str. Bed 36" x 36"
180 ton Hamilton 2512, 12" Str. 8 1/2" Bed Ups
200 ton Clearing F1200-12, Stroke 20", Bed 41"x38"
200 ton Bliss 28 1/2" Str. Bed 29" x 29"

PRESSES-KNUCKLE JOINT

600 ton Clearing K-1000 30, 4" stroke, Bed 36"x36"
1500 ton Vernon Stroke, Bed 48"x18"

PUNCH & SHEAR COMBINATIONS

Cleveland Style EP, Arch Jaw Cap. 1 1/2" x 1"
Cleveland Style G Single End 60" Throat
Cleveland Style W, 60" Throat, Architectural Jaw

25" King, 22" Throat, With Thomas Duplicator

ROLLING MILLS

6' x 5' Torrington Wire Flattening Mill Line
8' x 16' Schmitz Single Stand Two High
10' x 11' Single Stand Two High
10' x 16' Single Stand Two High
12' x 12' Single Stand Two High

12' x 16" Single Stand Two High
16' x 24" Single Stand Two High
30' x 30" Single Stand Two High

ROLL-PLATE STRAIGHTENING

42" Custom Built, Eight Rolls 7 1/2" dia.
72" Niles, 7 Rolls 9" Dia. Motor Driven

SHEAR-ALLIGATOR

No. 1 Mesa, 411 LK, Capacity 2" x 12"

SHEARS-GATE

6' x 1" Hilles & Jones 26

22' x 1" Niagara Model 1212, NEW 1951

SHEAR LINES

36" x 620 Ga. Hallden Shear Line

53" x 3 1/2" Heavy Duty Shear Line

60" x 7 Ga. Shear Line

60" x 14 Ga. Cleveland Shear Line

SHEARS-SQUARING

6' x 10 Ga. Niagara No. 672

16' x 3 1/2" Cincinnati 21810

16' x 3 1/2" Cincinnati 22510

SHEARS-ANGLE

6' x 6 x 3/4 Hilles & Jones

4' x 1 1/2" Long Alligator

SLITTERS

24" Yoder Slitting Line

26" Paxon Slitting Line

STRAIGHTENER

Medart, 3 Roll, Capacity to 4 1/2" Tubing

SWAGING MACHINES

24 Feun, Capacity 2 1/2" Tubing, LATE

Model X-30A Robin size 16" x 19 1/2"

Die Length Hydraulic Feed, LATE

WIRE MACHINERY

New England Butt Co. 4-Rod Planetary rollers

Model X-30A Robin size 16" x 19 1/2"

Van Horn Wire Drawing Machine, 4 Blocks 22" Dia.

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2000# Chambersburg Pneumatic Forging Hammer, Late Type, Serial 20CH392L7.

4000 lb. Chambersburg Double Frame Steam Forg. Hammer

2500 lb. Erie Single Leg Steam Forg. Hammer

Bliss Trimming Presses Tie Rod Construction Side Shears Capacities 113, 150, 190 tons

United Engineering & Fdry. Alligator Shear Clutch operated; Cap. 6 1/2" Sq.

3—2-ton Denison Auto. Hopper Feed & Index Table Hydr. Multipress

2500 lb. Model E Chambersburg Steam Drop Hammer, New 1944

6' x 10 ga. Cincinnati Squaring Shear 1/4" x 8" Pesto Gate Shear; 20" throat

4" National High Duty Upsetting & Forging Machine, air clutch, also one with regular clutch, also 1", 2", 3"

Williams White Bulldozers from 5-ton to 300-ton

Landis Landmaco and other Landis Threading Machines

Single & Double End Punches

No. 3 Match & Merryweather Saw, with Saw Grinder

No. 3 Waterbury Farrel Progressive Header, Cap. 1/2"; 4 stations and 1 Cutoff

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THREADING MACHINES, TAPPERS,

COLD BOLT TRIMMERS, SLOTTERS,

HOT HEADERS AND TRIMMERS, COLD AND HOT PUNCH NUT MACHINES.

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8' x 1 1/4" Niagara Shallow Gap Power Squaring Shear, M.D.

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ELECTRIC POWER EQUIPMENT

DC MOTORS

Qu.	H.P.	Make	Type	Volts	RPM
1	5000	Elliott		475	320
1	2250	Elliott		600	300/300
1	2200	G.E.	MCP	600	400/500
1	1750	Elliott		250	175/350
1	1375	G.E.	MCP	600	415
1	1280	G.E.	MCP	600	450/600
1	940	Whae.	QM	250	140/170
3	800	G.E.	MCP	250	400/750
2	450	Whae.		550	415
2	300	G.E.	MPC	250	400
2	200	Whae.	CR-207 4	250	850/1200
2	125	Whae.	SK-180	250	450/1200
1	150	G.E.	CDRB	600	250/700
1	150	Cr. Wh.	65-H	230	1150
1	125	Whae.	SK-185	230	350/1050
1	125	Whae.	SK-183	250	850
2	100	Whae.	SK-181	230	450/1000
1	60/100	G.E.	RF-17	230	450/900
1	75	G.E.	CD-12M1	230	850
2	75	Cr. Wh.	351TEFC	230	800
1	50	G.E.	MD-412-AE	230	550
6	40	Rel BR	385TEFC	230	500/1500
2	30/40	Whae. D.P.	SK-181 5-BB	230	500/1500
2	(unused)	30 G.E.	CDM-85-R	230	2200

MG SETS—3 Ph. 40 Cy.

Qu.	K.W.	Make	RPM	DC Volts	AC Volts
2	2000/2400	G.E.	450	250/300	2300/4600
1	2000	G.E.	514	600	2300/4600
2	1750/2100	G.E.	814	250/300	2500/4600
2	1000	G.E.	720	600	6000/13200
1	750	G.E.	720	125/250	2500/4600
1	500	Whae.	800	125/250	2500/4600
1	500	G.E.	900	125/250	440/2300
2	300	G.E.	1200	250	2300
1	300	Whae.	1200	275	410/2300
1	250	Whae.	1200	275	2300
1	200	ET Ma.	1200	250	2300/4600
1	200	Whae.	1200	550	2300
1	200	G.E.	1200	950	440

TRANSFORMERS

Qu.	KVA	Make	Type	Ph.	Voltages
1	3333	Whae.	OTSC	1	13500 x 2500
1	3000	A.C.	OTSC	3	33000 x 2300
1	1500	G.E. auto	HT	3	4000/4200/4100
3	1000	G.E.	HYDRI	1	2400 x 480
3	1000	G.E.	GA/FA	1	13500 x 220/480
1	833	G.E.	H	1	4800 x 460
2	750	G.E.	Perranol	1	4800 x 83/85
3	500	Kuhl	OTSC	1	13200 x 6000
1	500	Kuhl		1	4800/2100 x 240/480
1	300	G.E.	HT	3	4100 x 480/277
2	200	Al Ch.	OTSC	1	2300 x 250/460
3	150	G.E.		1	33000 x 2300/4000Y

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4" National high duty upsetting, forging, 4 point clutch with air operator

3' 3 1/2" Ajax upsetter steel frame

3" National high duty upsetting, forging, air clutch (2)

1 1/2" National all steel upsetting, forging, hard ways

1" National high duty upsetting, forging, new 1947, air clutch

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Economy type KK automatic bolt head shaving, pointing machine

38" throat New Doty Mfg. No. 17F single geared single end punching and shearing, MD

36" Rockford open side universal shaper planer, mechanical, motor drive

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- 1—42" 8" ROLL LEVELLER. Capacity .125" to .250" Gauge. driven by 37 1/2 H.P. Motor—230 Volts DC.
- 1—48" 17" ROLL LEVELLER. Rolls 4 1/2" Diameter. Capacity .125" Gauge. Driven by 15 H.P. Motor—230 Volts DC.
- 2—18" x 37" x 36" 4-HI HOT STRIP MILL STANDS. Complete with Rolls, Chocks, Bearings, Spindles, Pinion Stand, Motor-Operated Screw-down, etc.

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- (1)—Starting panel for syn. motor
- (1)—4 unit exciter set
- (1)—Set of variable voltage control

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5	1500	Al Ch	514	250/700	13800/6900/4160
1	1450	Whse	900	600	2300/4000
2	1250	Al Ch	720	600	2700/4000
1	850	G E	720	240/250	2300
1	725	Whse	900	600	2300/4000
1	500	Cr Wh	720	600	2300/440
1	500	G E	900	250	2300
4	300	Whse	1200	125/250	2300
1	300	Al Ch	1200	250/300	2300
(3 units)					
2	200	Whse	1200	125/250	2700/440
2	150	Rel	1200	125	2300/440
1	150	Whse	1200	125/250	2300/440
1	150	G E	1200	250	4600/2300
1	100	Whse	720	125/250	220
1	75	Whse	1200	125/250	2300

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- 14" x 30" centers Lodge & Shipley, m.d.
- 14" x 30 1/4" centers Lodge & Shipley, m.d.
- 14" x 31 1/4" centers Lodge & Shipley, m.d.
- 14" x 32 1/2" centers Springfield, m.d., taper
- 14" x 33" centers Sidney, m.d.
- 14" x 33 1/2" centers Lodge & Shipley, m.d.
- 14" x 34" centers LeBlond, cone
- 14" x 36" centers LeBlond Geared Head, s.p.d.
- 14" x 36" centers Monarch, motorized, cone
- 14" x 36" centers Pratt & Whitney, cone
- 14" x 54" centers Reed Prentice Geared Head, m.d., taper
- 16" x 28 1/2" centers Hendey Yoke Head, m.d., taper
- 16" x 29 1/2" centers Lodge & Shipley Selective Head, m.d.
- 16" x 29 1/2" centers Monarch Geared Head, m.d.
- 16" x 30" centers American High Duty, m.d.
- 16" x 30" centers Monarch Model CY Toolmakers, m.d., Keller Attachment
- 16" x 30" centers Monarch, m.d., taper
- 16" x 30" centers Monarch, Model CW, m.d.
- 16" x 30" centers Hendey Geared Head, m.d.
- 16" x 36" centers Lehmann, m.d.
- 16" x 102" centers American High Duty, m.d.
- 16" x 30" centers Reed Prentice, m.d.
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- 16" x 54" centers Monarch, m.d., taper
- 16" x 55 1/2" centers Monarch, m.d.
- 18" x 30" centers American, m.d., 8 speed
- 18" x 39" centers Groves-Klusman, m.d.
- 18" x 48" centers Lodge & Shipley, m.d.
- 18" x 49" centers Lodge & Shipley, m.d.
- 18" x 51" centers American Geared Head, m.d.
- 18" x 51" centers Hendey Geared Head, m.d., taper
- 18" x 54" centers American, m.d., Timken
- 18" x 60" centers Cincinnati Tray Top, m.d.
- 18" x 72" centers Cincinnati Tray Top, m.d.
- 18" x 106" centers (110" centers tailstock overhang) American, m.d.
- 19" x 48" centers LeBlond Geared Head, Timken, m.d.
- 19" x 68" centers LeBlond Geared Head, m.d.
- 20" x 46 1/2" centers Lodge & Shipley, m.d.
- 20" x 48" centers Boye & Emmes, m.d.
- 20" x 55" centers Groves-Klusman, m.d.
- 20" x 70" centers American, m.d., taper
- 20" x 72" centers Boye & Emmes, cone, motorized
- 20" x 72" centers Boye & Emmes, m.d., taper
- 20" x 77" centers Sidney Geared Head, m.d.
- 20" x 168" centers Boye & Emmes, m.d.
- 21" x 42" centers LeBlond, m.d., taper
- 24" x 51 1/2" centers Lodge & Shipley, m.d., taper
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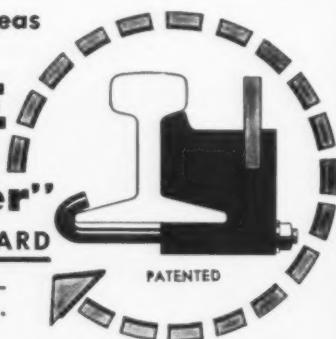
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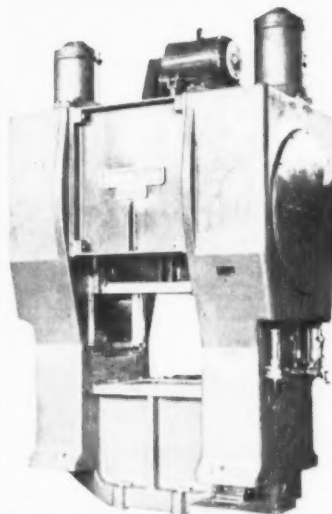
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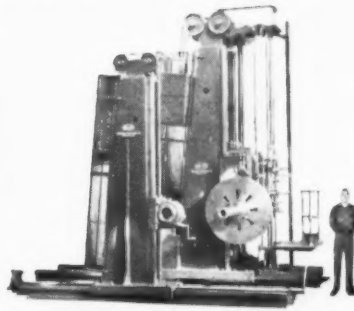
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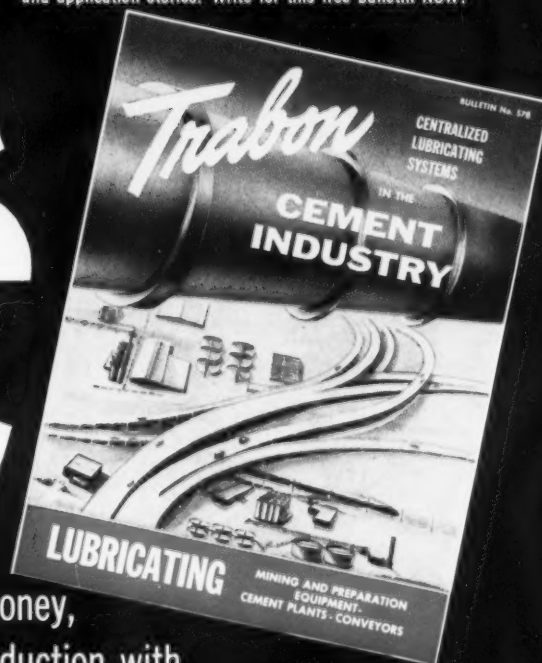
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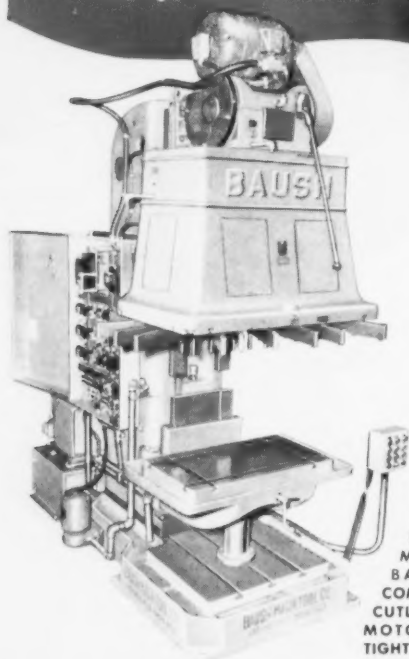
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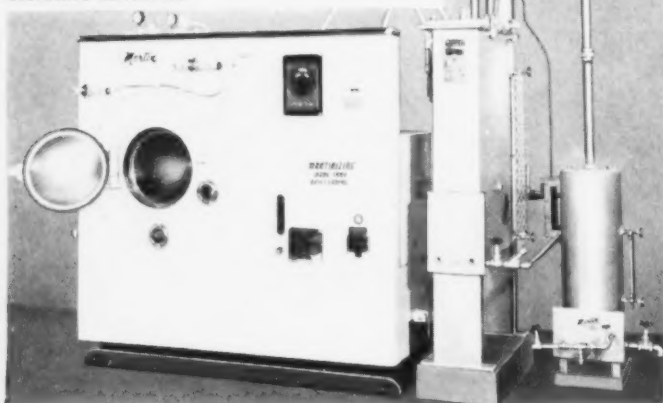
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